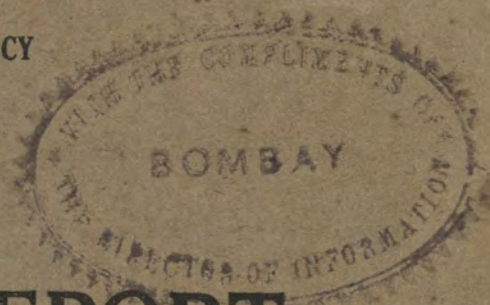


DEPARTMENT OF INDUSTRIES

BOMBAY PRESIDENCY



ANNUAL REPORT

1922-23 - 1936-37

(except 1923-24 + 1927-28)



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No. C.—2277.

OFFICE OF THE DIRECTOR OF INDUSTRIES,
Old Customs House,
Bombay, the 7th September 1923.

FROM

H. F. KNIGHT, Esq., I.C.S.,
Acting Director of Industries,
Bombay ;

TO

THE SECRETARY TO GOVERNMENT,
General Department,
Bombay.

Annual Report—1922-23.

Sir,

I have the honour to submit the annual report of the Department of Industries for the year 1922-23, 1st August to 31st July.

Mr. R. D. Bell, C.I.E., I.C.S., was in charge of the Department from the beginning of the year to the 18th of May 1923, when he proceeded on six months' leave, since when I have held charge.

STAFF.

2. Mr. G. H. Thiselton-Dyer held the appointment of Deputy Director of Industries till the end of February 1923. The post was abolished from the beginning of March and Mr. Thiselton-Dyer reverted to his appointment of Mechanical Engineer to Government. From the beginning of the year, he had been entirely occupied in giving assistance to the Excise Department in connection with the Government Central Distillery, Nasik, which was being converted from its original design of an acetone factory.

Mr. F. E. Bharucha held the post of Assistant Director of Industries throughout the year. As a measure of retrenchment, his head-quarters were transferred in February from Ahmedabad to Bombay and the Ahmedabad office was closed.

Mr. F. C. Davies held the post of Executive Engineer, Central Store and Workshops, Dapuri, Kinkee, with Mr. C. Holliman as Works Manager, until the end of February, when the Dapuri Workshops were transferred

to the Public Works Department and both officers were transferred with it.

Mr. A. E. Hefford held the post of Marine Biologist till the 24th of December on which date the Fisheries section of the Department was entirely closed and Mr. Hefford returned to England to rejoin his permanent appointment with the Ministry of Fisheries and Agriculture, from which his services had been lent.

Mr. E. R. Fern, Superintendent of Pottery, Sir. J. J. School of Art, served as pottery expert throughout the year.

Dr. A. N. Meldrum of the Royal Institute of Science and Mr. A. J. Turner, Principal of the Victoria Jubilee Technical Institute, in addition to their ordinary duties, dealt with chemical problems for this Department. Mr. C. B. Almoula served as Assistant Chemist under Dr. Meldrum and Mr. M. M. Koppikar as Assistant under Mr. Turner till the 22nd of March 1923, when his services were terminated.

3. As Mr. Bell remarked last year, the work of the Director is not solely confined to the charge of the Department of Industries. He is the controlling officer for the administration of the departments of Factories and of Boilers and Smoke Nuisances, for which separate reports are published. In October 1922, the Director was appointed Chairman of the Board of Trustees of the Victoria Jubilee Technical Institute and of the Committee of Direction for Technical Education. He is also a member of the Advisory Committee of the Poona College of Engineering and the Royal Institute of Science, a trustee of the Prince of Wales Museum, member of the Co-operative Conference Committee, and Chairman of the Organising Committee of the British Empire Exhibition. Mr. Bell was a member of the Bombay Legislative Council from 4th December 1922 to 25th January 1923 and from 12th March to 2nd May 1923. I have been appointed a member of the Bombay Excise Committee. The total number of meetings exclusive of those of the Advisory Committee of the Department of Industries and of the Legislative Council attended during the year was 55.

4. *Touring*.—Touring as last year was hampered by the difficulty of leaving Bombay due to the number of miscellaneous duties to be performed. But Mr. Bell besides visits to Calcutta, Poona and Ahmedabad was able to inspect the Departmental weaving schools and demonstrations scattered over the Deccan.

EXPENDITURE.

5. The expenditure incurred by the Department during the financial year 1922-23 and the two preceding years has been as follows :—

				Rs.
1920-21	..	..	..	1,46,000
1921-22	..	..	..	1,73,000
1922-23	..	.	..	2,39,000

(The main causes of increase were in the grant of travelling scholarships, more efficient touring by the weaving and dyeing assistants and the charges involved in starting the semi-commercial scale pottery plant.)

ADVISORY COMMITTEE.

6. In the middle of the year 1922, Mr. A. J. Hood has been appointed in the place of Mr. A. T. Arnal, but he resigned in the beginning of 1923, and Mr. A. Greville Bullocke was appointed in his place. Mr. Mangaldas Girdhardas resigned in April, and his place was taken by Seth Kastoorbhai Lalbhai. The Committee now consists of the following members :—

- (1) Director of Industries, *Ex-officio* Chairman.
- (2) Sir Alfred Chatterton, Kt., C.I.E.
- (3) The Honourable Sir Purshottamdas Thakurdas, Kt., C.I.E., M.B.E.
- (4) Ambalal Sarabhai, Esq.
- (5) G. B. Trivedi, Esq., B.A., M.L.C.
- (6) Seth Kastoorbhai Lalbhai.
- (7) Rao Bahadur R. R. Kale, LL.B., M.L.C.
- (8) Mahomedbhoy Currimbhoy, Esq.
- (9) Jehangir Bomanji Petit, Esq., M.L.C.
- (10) A. Greville Bullocke, Esq., M.L.C.
- (11) N. Birrell, Esq.
- (12) Sir M. de P. Webb, Kt., C.I.E., C.B.E., M.L.A.
- (13) Lalji Naranji, Esq., M.L.C.

Of the twelve non-official members of the Committee, five are members of the Bombay Legislative Council.

At the end of 1922, Government invited the opinion of the Advisory Committee as to the advisability of the Department of Industries being closed down as a measure of retrenchment. In view of the stringency in Provincial finances, the majority of the Committee were of opinion that the Department should be brought to end and its functions distributed among other Departments of Government. Finally, however, in April 1923, Government decided that, after effecting various retrenchments in expenditure, the Department should continue to exist in a skeleton form. The uncertainty as to the future, of course, has somewhat hampered the activities of the Department and is partly responsible for the fact that in the year under report only five meetings of the Advisory Committee were held. Further, owing to financial stringency, and the Department having no funds available with which to inaugurate fresh schemes, there were few questions on which the opinion of the Advisory Committee could be

sought. The chief subjects on which the advice of the Committee was given to Government were :—

- (1) the grant of a concession for the manufacture of paper from grass in the West Khandesh District ;
- (2) repeal of the Apprentices Act ;
- (3) the question of State aid to industries ;
- (4) a scheme proposed by the Government of India for the improvement of indigenous arts and crafts ;
- (5) the marking of cotton bales, maintenance of cotton press records, submission of statistical returns and licensing of gins and presses in connection with the adulteration of cotton, and proposed legislation on the subject ;
- (6) application for loans for industrial purposes from—
 - (a) Mr. L. V. Tikekar of Sholapur and
 - (b) the Gauri Gold and Silver Works Company of Surat ;
- (7) the selection of two state technical scholars ;
- (8) application of The Tata Iron and Steel Company for an annual grant-in-aid to the technical institute at Jamshedpur ;
- (9) a suggested reduction in the import duty of automatic handlooms ;
- (10) a proposed weaving demonstration with automatic handlooms at Dhulia.

In addition, of course, the budget of the Department was referred to the Committee.

The organization of the Bombay exhibit for the British Empire Exhibition, which employed much of the Department's time, was entrusted to an Organising Committee of which four meetings were held.

Government had also referred to the Advisory Committee the suggestion that a provincial stores purchase department should be constituted. At the end of the year, the matter had not been fully discussed by the Committee but Government have issued orders that the Director of Industries shall in future scrutinise all contracts to be made by the Medical and Jail Departments and should draw up in consultation with the Surgeon General and the Inspector General of Prisons a set of rules for this purpose.

POLICY.

7. The industrial depression referred to last year has not yet lightened and there are few signs of any extensive industrial developments in the near future. Public confidence appears to have been shaken and money for new schemes is not forthcoming. Retrenchments have been effected in the Department, the Fisheries section has been abolished, the Deputy Director dispensed with, the experiments in button making stopped, and the Dapuri Workshops handed over to the Public Works Department.

Briefly, the Department has to mark time pending improvement of conditions all round.

COTTAGE INDUSTRIES.

8. *Handloom Weaving*.—The work was as hitherto mainly concentrated on the introduction of the improved fly-shuttle loom and there were working four weaving schools and six weaving demonstrations. Mr. Bell last year detailed the method on which the weaving schools and demonstrations are conducted and it is sufficient here to mention that in the schools, boys, almost entirely of the weaving class, are taught the use of improved mechanism and a school is kept running in a village until a number of fly-shuttle looms have been adopted by the local weavers or until experience shows that no progress is likely to be made. The weaving demonstrations are conducted by a demonstrator who is posted to a village with two fly-shuttle looms on one of which he works and on the other any weaver wishing to learn the new loom can practice. In the year under report, there were weaving schools held at Bhingar (District Ahmednagar), Nasik, and Bagalkot (District Bijapur) while one school was transferred from Faizpur (District East Khandesh) to Parola in the same district. The number of fly-shuttle looms introduced was : Bhingar 105, Nasik 77, Bagalkot 97, Faizpur 90 and Parola 96. These results are quite satisfactory and the school at Bhingar after just over a year's working had made such progress in the introduction of fly-shuttle looms that it can now be moved elsewhere. Here the example of Ahmednagar where a large number of looms had been introduced last year was of great value and indicates how improved methods can spread from one town to another.

At the beginning of the year there were weaving demonstrations at Poona and Parola. The Parola demonstration was then removed to Dholka in Gujarat, but there little progress has been made. The Dholka weavers are in a very impoverished condition and entirely in the hands of their sowkars and the Department had no Gujarati demonstrator available to run the demonstration. It is proposed to transfer this demonstration to Bulsar where the condition of the weavers is not so unsatisfactory and where it is intended to appoint a Gujarati man in charge. The Parola demonstration was removed to Dhulia for demonstrating the double box fly-shuttle loom to the weavers there who had requested a demonstration of improved looms. The double box looms were taken up but the local weavers are anxious for still more advanced practice and proposals have been submitted for holding a demonstration of various automatic handlooms there. In the Southern Division, there were weaving demonstrations held at Guledgud and Nalatvad (District Bijapur), Betgeri (District Dharwar), Bailhongal (District Belgaum) and Karad (District Satara). The two last were removed to Manoli (District Belgaum) and Kolevadi (District Satara) in March 1923 while the Nalatvad and Betgeri demonstrations were

transferred to Bijapur and Shirol (District Dharwar). A special effort was made to exhibit to the silk weavers of Betgeri, the possibility of weaving silk saris on the fly-shuttle looms, because these weavers were doubtful whether refined work could be done on this loom. The demonstration was quite successful.

9. The experiment referred to in last year's report of training agriculturists to take up weaving as a spare time occupation was continued at the village of Hebsur in the Dharwar District. This village had been chosen because the villagers there were already accustomed to weaving 'gudars' or coverings for threshing floors, and in consequence of the school half a dozen agriculturists took up the work of weaving shirtings, saris or similar cloths on fly-shuttle looms during the slack season. As a means of introducing sari and shirting weaving as an agriculturist's spare time occupation, the experiment has not been quite conclusive. It has, however, resulted in a more economical manufacture of 'gudars'. These were formerly woven in narrow strips 8" broad, and 18 of these strips were sewn together to form a 'gudar' of 12' breadth. With the fly-shuttle loom, however, the 'gudars' are now woven 24" wide and with a warp of about 90' long instead of some 13' so that cutting this into six pieces gives enough for a 'gudar' of $14\frac{1}{2}' \times 12'$ composed of six instead of 18 separate strips. With the consequent difference in the cost of sewing, the cost of weaving and stitching one 'gudar' has been reduced from Rs. 2-3-0 to 14 annas. Where the villager can profitably produce 'gudars' on these lines, it is little use expecting him to desert that work for the production of shirtings or saris in his spare time. The school at Hebsur was therefore closed and the experiment is being repeated at Hulkoti where the inhabitants do not habitually use 'gudar' weaving as a spare time occupation.

10. *Weaving Re-organisation.*—Proposals were submitted by Mr. Bell for the re-organisation of the weaving section of the Department. So far, it has been practically impossible to touch Sind or Gujarat and the operations have been confined to the Deccan and the Southern Maratha Country. It was also desired to start a weaving institute where experiments in various looms, etc., could be carried on and demonstrators trained for the Department. Owing to financial stringency, it was impossible to introduce most of the proposals. The pay of the assistant weaving masters was revised—a much needed reform—but the weaving institute and the new schools and demonstrations for Gujarat and Sind have had to be left in abeyance.

11. *Preparatory Processes.*—The sizing and warping machine referred to last year was still under experiment and after various trials, satisfactory tests were undertaken at Amalsad, the main requirement being that for proper working a man trained in power textile machinery was imperatively needed. A jobber was secured from Ahmedabad and under his care the machine worked very well. The Indian Industrial Exhibition held at

Surat in May 1923 gave the Department an opportunity of exhibiting the sizing and warping machine as well as pirn and bobbin winding machines and the fly-shuttle loom. Arrangements were made so that the whole process, from the unwinding of cotton from the hanks, sizing, warping and weaving on the fly-shuttle loom was exhibited in continuous working. The demonstration excited very considerable interest among the weavers in Surat and visitors from other parts of Gujarat and there was no question that the machine was of practical value. The difficulties in the way of its introduction are, however, the need of a trained man to look after it and the consequent cost of running and the fact that it produces more sized warp than is required for a single weaver. It should be of value, however, for small power or handloom factories where some 12 or 15 looms are employed. Efforts were made to induce some of the Surat weaving factory proprietors to take over the machine on loan and run it in their own factories, but none of them were willing to do so unless this Department bore the expenses. Therefore owing to lack of funds and having regard to the fact that if the borrower of the machine had to pay the expenses, he would certainly treat the machine more carefully and the experiment would be far more just, no arrangements could be made at Surat. Thereafter the machine was loaned to the proprietors of the Peoples' Pioneer Loom Factory at Ankleshwar, who were prepared to stand all the charges, and it was with this firm at the end of the year.

12. As Mr. Bell had pointed out, the expenditure on weaving instruction in this Presidency is very small compared with that elsewhere, and it is perhaps sometimes forgotten that the handloom industry is one of the most important in India. Probably in Bombay Presidency, there are some 8,00,000 people who depend wholly or largely on handloom weaving as their means of subsistence. There are 300 places in the Presidency where weaving is carried on with handlooms ranging in number from 20 to 5,000. Even in Bombay city itself, handloom weaving continues despite the competition of the Bombay mills. The introduction of the fly-shuttle loom has made a great difference to the economic status of the weavers who have adopted it. It is calculated that a weaver's output has been increased by about 40 per cent. and while, of course, the lack of imports during the war and the general rise in prices has had its effects in improving his lot, yet it is incontrovertable that where the fly-shuttle loom has taken root in this Presidency, there the condition of the weaver is very different to what it was a few years ago. But it is also clear that to continue to compete with the mill industry, there must be continued improvement and experiment on the handloom. Whether an automatic handloom which will be within the reach of the weaver's pocket and also suitable for his cramped workshop can be economically produced is not at present apparent, but there is every reason that endeavours should be made to produce such a loom. Further, and probably, at the moment, of greater importance is the need for experiment in the preparatory processes of

weaving. The ordinary handloom weaver wastes an enormous part of his time in preparing warps on the most primitive methods and of a most uneconomical shortness. Research is urgently needed on the most practicable and cheapest methods of preparing the yarn for the loom. The warping and sizing machine to which reference was made above is not suitable for the ordinary village weaver. It is for this reason among others that a weaving institute is a prime necessity in the Presidency. It cannot, of course, be said that such an institute will solve all, or even any, of the outstanding problems, but the importance of the hand loom weaving industry is such and the need for it to take every method it can, to compete with the power loom industry is so great, that a weaving institute could be justified however unsuccessful it might prove.

13. *Dyeing and Calico Printing*.—The dyeing and calico printing experiments referred to last year have born fruit in that, two firms in Ahmedabad and one in Surat have taken up the manufacture of calico prints on the improved method. The designs furnished by the School of Art were appreciated but unfortunately in some cases these designs being in black and white only, the local dyers produced most unfortunate combinations of colours when they came to print them. But the School of Art was again consulted and there are hopes that an eye for colour may be developed. Some of the calico prints were sent to the British Industries Fair, but few orders were taken mainly, I think, owing to overpricing. The dyeing demonstration was transferred to Faizpur (Khandesh) in April, and was distinctly successful. It was originally intended to keep it there for three months but the local dyers put in a petition for its retention and it was still there at the end of the year. There seems a very distinct opening for this work in the Presidency.

14. During the year it appeared that a possible outlet for Bombay products might be found in the printed cloths used by the natives of East Africa and the Indian Trade Commissioner in East Africa was approached and he sent to Bombay samples of the hand printed cloths imported into East Africa from Manchester and Holland. These are 46" wide and 66" long and are known as 'Khangas'. They are supplied in various styles and the fashions are always changing as each competing importer attempts to obtain an exclusive and attractive model. As many of the importers are Indian firms, there seems no reason why a part at any rate of this trade (worth Rs. 15,00,000 in 1921-22) should not be taken over by Bombay. Attempts were made to interest the Bombay mills which do machine printing but without success, and the Ahmedabad hand printing works were then approached but with no very great result. This appears a direction in which Bombay enterprise might be employed.

15. *Casein*.—The small demonstration factory at Anand is still working under Mr. M. T. Shah. Its operations were suspended during August and September on account of the monsoon causing difficulties in drying

the casein. But a casein dryer designed by Mr. Thiselton-Dyer has been tried and found to be effective with lactic casein and during the present monsoon will be tried on rennet casein. During the year, experiments have been carried on in the making of casein with the employment of vegetable rennets and it has been found that the pulp of the immature fruit of *Withania coagulans* serves the purpose well. The product is satisfactory except for a yellow or brown tinge which it is hoped to eliminate and when a sufficient stock has been accumulated, another attempt to test the London market will be made. Rennet casein is in demand in Europe and America for the manufacture of certain artificial ivories and celluloid substitutes such as 'galalith' and Erinoid. There were difficulties as last year in getting a sufficient supply of separated milk, as the price rose from 11 annas per 60 lbs. to Rs. 1-8-0 per 60 lbs. These fluctuations depend firstly on the rate at which separated milk is exported to Bombay and, secondly, on the price of village casein. The price of the latter has fluctuated very widely. At one time during the year, it was Rs. 20 per 40 lbs. but at the end of the year it varied between Rs. 9 and Rs. 12. Such fluctuations appear unavoidable in view of the system of trading and forward selling employed by dealers in casein.

16. In November, a consignment of about 24 cwts. of lactic casein prepared at the demonstration factory was sent to Messrs. Nieuwhof Surie & Co., London for sale, the object being to test the London market and to discover whether the improved quality of casein prepared at the demonstration factory would on the London market fetch a better price than the ordinary Indian Casein which owing to the somewhat careless methods of manufacture employed, is usually impure, and commands only a poor price. Unfortunately, the Company to whom the consignment was sent went into liquidation, and though the consignment was sold at £ 85 a ton, it has not been possible to get any definitive data as to the relative value of our factory casein. A sample of casein was however sent to a firm of analytical chemists who reported it as much superior to the usual quality of Indian casein and estimated it worth a premium of 10 per cent.; it was further stated that if a lower fat content could be secured, this casein would approach the French and Dutch. This is a distinctly encouraging report, but until a commercial quantity of our casein has been sold on the London market, it is not possible to say definitely what enhanced value it will command.

DEVELOPMENT OF INDUSTRIES.

17. A certain number of new industrial developments took place during the year to some of which this Department was able to afford assistance.

(a) The Pioneer Rubber and Industrial Works Co., Ltd., Bombay, has started production at its works and it seems probable that its products will be able to compete successfully in many directions with imported

goods, especially as the present tariff affords in most cases a protection of 30 per cent.

(b) The New Oil Mills are now under construction at Vadala near Bombay. It is proposed to manufacture castor oil, linseed oil, and some edible oils on a large scale and the experiment will be watched with interest.

(c) A concession had been granted by Government to the Eastern Development Corporation, Ltd., for the collection of gum-oleo-resin of *Boswellia Serrata* in Khandesh. The terms of the concession have been fixed and further progress is awaited.

(d) A scheme has been brought out for the manufacture of artificial silk in Bombay, but the matter has not yet reached the stage of production.

(e) Government have granted a concession to Messrs. Abdulabhoj and Joomabhoj Laljee, who own a concession for the manufacture of salt in Aden, of an additional plot of 25 acres of land for the manufacture of chemicals from the waste products in their salt works at Sheik Othman. It is proposed to produce such bye-products as magnesium sulphate, potassium sulphate, magnesium chloride, etc., but no report of the actual production having started has yet been received.

Assistance was given by the Department to a raw hide factory in Ahmedabad in regard to the colouring of pickers, to a manufacturer of inks in Poona and to a paint and oil company who were having trouble with the expression of groundnut oil.

The Assistant Director gave assistance in a number of cases detailed in Appendix A.

CHEMICAL RESEARCH.

18. Owing to the absence of new industrial enterprise and the departmental retrenchment, there were no fresh developments in chemical research.

19. *Lactic Casein*.—A sample of lactic casein out of that sent home was examined by Messrs. Solomon and Seba and the following was the resulting analysis :—

				Per cent.
Moisture	..	..	..	8.7
*Protein (by difference)	..	..	..	81.6
Ash	..	..	..	3.8
Fat	..	..	..	3.2
Acidity (as Lactic Acid)	..	..	..	2.7
				100.0
*Protein by direct determination	..	..	..	78.6
Silica (Sand)	..	..	..	0.5
Solubility in Borax Solutions, etc.	..	..	..	Complete.
Adhesive Strength	..	..	..	Good.
Colour	..	..	..	Good.

20. Mention was made in last year's report of the difference of opinion between the Imperial Institute, London and the local officers of this Department as to the best method of determining the fat in casein. The Imperial Institute had not accepted the method employed in Bombay which with variations is widely used elsewhere and this was subjected to a comprehensive review by the Imperial Institute to prove that the Werner-Schmidt method gave more reliable results than that followed by Dr. Meldrum and Mr. Gangolli. The opinion of the Imperial Institute was not accepted by Dr. Meldrum and Mr. Gangolli, and the technical discussion of the point is still in progress.

21. *Casein Glue*.—The glue testing machine referred to last year was late in arrival and was only erected just before the end of the year, and at present no comparative results of tests are available.

22. *Magnesium Chloride*.—The Pioneer Magnesia Works at Kharaghoda had been producing magnesium chloride during the year but prices have been steadily falling and it was necessary for Government to revise the basis on which royalty was taken and it is now taken on a profit sharing basis. At the moment, the imported magnesium chloride is at such a low price that it is practically impossible for the Pioneer Magnesia Works to produce at a profit and there seems justification for an enquiry into whether this is not a suitable case for the introduction of a measure of protection by tariff.

Reference was made last year to the discoloration of the magnesium chloride produced at Kharaghoda. Experiments were undertaken by Mr. Turner with a view to finding a means of removing this discoloration and these were finally successful and the necessary information was communicated to the Company.

23. *Sind Trona*.—Further investigations were made into the Trona deposits in Sind. Mr. Koppikar, Assistant Chemist, visited Sind in March and made a report on the conditions required for successful working of the Dhands (shallow lakes in which water concentrates during the dry season and the Chaniho (crude carbonate of soda) can be collected just before the rains). From his investigation, it appeared that the liquor in the dhands should not be allowed to evaporate to a specific gravity above 1.28 and that the deeper the liquor in the dhand, the more likely that the proper concentration can be preserved during the period of working. A sample of trona was sent for opinion to the Chairman of the Glass Committee of the Institute of Chemistry and he reported that the trona is suitable for window glass, bottle glass or glass of any ordinary kind, but not for lead glass or other fine type. It is suitable for the type of glass at present manufactured in India but it would be unwise to press the claim of this trona on local glass manufacturers unless a regular supply of a uniform quality is assured. At present it is impossible to say that we have an assured supply of good trona and in any case, the soda ash trade, as

Mr. Bell stated last year, is well organised and has a standardised product and quality. The experiments, however, are being carried out again next year and now that more information is available as to the conditions necessary to secure pure trona, it will be possible to form a juster estimate of the value of the deposits.

POTTERY.

24. Mr. E. R. Fern was in charge of the Pottery section of the School of Art, Bombay, throughout the year. There were nine students under instruction. Mr. Fern is also in charge of the semi-commercial scale pottery factory belonging to this Department. The machinery from home was received late in December and various unforeseen difficulties arose and as a result it was not possible to get the factory working before the end of the year (it started work in August). Over 300 experiments have been made for flooring tiles in various colours, fifty experiments for white vitreous tiles, and thirty experiments for a new earthenware body for crockeryware and glazed wall tiles. Analyses were made on 42 clays and advice given to 13 persons who called at the School of Art. Some extremely successful vases were made and exhibited at the School of Art Exhibition and realized very encouraging prices.

FISHERIES.

25. The steam trawler "William Carrick" was sold before the beginning of the year and the work of the Marine Biologist was restricted to compilation of the report on the work of the steam trawler and his post was finally abolished on the 23rd of December. The report on the work of the steam trawler was published and aroused some interest. It is a valuable scientific contribution to the study of Bombay fisheries even though the financial result of the working of the trawler was not successful. The collection of specimens made by the Marine Biologist was handed over to the Royal Institute of Science. During the year, a cold storage system was introduced at the Crawford Market in Bombay which may be of assistance to any future trawling enterprise in the city.

26. The work of the "William Carrick" is probably responsible for the enterprise of a private firm in Bombay which hired the steam trawler "Madras" from the Royal Indian Marine and worked it from the 1st of January till the 18th of July. Quite good results were obtained for the first five months, but it was finally decided to stop work in July because the Indian crew could not stand the monsoon conditions and the hard work, and it was found that the enterprise was no longer paying its way. The "Madras" was worked by an Indian crew with only two European officers as against four on the "William Carrick."

27. This experiment in conjunction with that of the "William Carrick" appears to establish the fact that successful trawling in Bombay needs a smaller kind of trawler and, to run it efficiently, probably a relief crew

during the monsoon and also cold storage accommodation at the point where the fish is landed whence it can be taken as required to the market. One point of rather depressing interest is that the "Madras" in five months landed nearly three lakh pounds of fish in Bombay but during the same period she threw overboard 108,000 lbs. of skate for which no market could be obtained in Bombay. If trawling is to be successful, it will be necessary to educate the local population to the fact that skate is an admirable edible fish. Not only does the throwing of skate overboard, mean waste of good food, but it also has a very deleterious effect on the fishing grounds in driving other fish away from the place. I am not sure, however, what steps this Department can take to educate the public gustatory taste in the direction of skate.

28. Other work in connection with fisheries was an investigation into certain mussell shells in the hope that they would be suitable for button making, which they were not, and an enquiry about the possibility of pearl oysters in the Thana creek.

29. The sardine oil experiments were continued but we were again unfortunate in that the supply of sardines was most inadequate and the fish could not be caught in any number when in a fat condition suitable for expressing the oil. However, about a ton of guano was produced and the experiment will be continued again next year in charge of the Salt Department.

COMMERCIAL AND INDUSTRIAL INTELLIGENCE.

30. An incomplete but representative list of enquiries during the year is given in Appendix B and shows their general nature.

Receipts of correspondence and official references, during the year under report were 5,877 as compared with 7,371 in 1921-22 and 7,049 in 1920-21. Letters issued were 5,775.

MISCELLANEOUS.

31. *Rosha Oil*.—Sometime back, a still for the distillation of rosha grass oil had been designed by the Forest Research Institute, Dehra Dun, and one was constructed and utilised by the Forest Department in the Presidency. The results were good to begin with but the unskilled handling and rough treatment which it received in the out of the way places, where it was necessary to operate it, eventually caused its failure. In consultation with Mr. Turner of the Victoria Jubilee Technical Institute and Dr. J. L. Simonsen of the Forest Research Institute, a new design was got out which was sent to a firm of manufacturers in England who sent out modified proposals on these lines and after further examination, Messrs. Blair, Campbell and McLean constructed a still of improved pattern. This still was received during the year and was erected at the Victoria Jubilee Technical Institute for a trial before being sent up to West Khandesh

where the Forest Department will conduct experiments in extraction of rosha grass oil. The plant was not received in time for erection before the rains and the heavy monsoon prevented a trial being made before the end of the year, but there seems likelihood of the improved plant being a success.

32. *Button Making*.—Retrenchment necessitated closing down the experiments in button making machinery which were being conducted at the Dapuri workshops. The machinery at first was “unbalanced” in that the output from various portions of it was not equal. When, however, it was finally got into running order, there seemed every hope of its successfully turning out excellent buttons, but there was no opportunity to test it on a commercial scale to see whether the buttons could be turned out at a price which would compete with imported articles. The machinery had to be dismantled and it is proposed to loan it to the United Provinces Department of Industries for the carrying out of further experiments.

33. *Match Making*.—An interesting development of the present tariff is the starting of a match factory at Santa Cruz. Machinery was imported from Japan for dipping and packing matches and also the splints are imported from Harbin ready cut, also the veneers for the boxes and in some cases labels also. These articles are imported at a tariff of 15 per cent. The splints are dipped and packed by hand at Santa Cruz and can compete in price with any of the imported matches which pay the full duty of Rs. 1-8-0 per gross. Recently there were some 400 people (largely women and children who were doing the packing) employed and a comparatively very large output of matches was being produced. The other Indian match factories in the Presidency which do not rely on imported splints have not had a good year of it. There had been rumours of evasion of the import duty on matches, which were reported to Government and on my last enquiry the Ahmedabad Match Factory were holding heavy stocks which they were unable to get rid of at a profit. They gave as the reason that the very heavy tariff afforded a very great inducement to evasion by imports through minor ports.

During the year, a note on the prospects of the match industry in the Bombay Presidency was prepared and printed for distribution. The manufacture of matches appears to be a great attraction to a large number of enquirers who often had little idea of the difficulties involved. Some proposed to start the manufacture as a cottage industry, others to use grass splints, etc., etc. It appears, likely however, that if the present tariff continues, firms from Sweden and Japan may consider the possibility of following the lead of the factory now working at Santa Cruz and import the component parts of matches at a low rate to avoid the heavy duty on the completed article.

34. *Gold and Silver Thread Industry*.—Mr. B. J. G. Shastri and J. K. Chapadia, who were awarded scholarships by the Government for the

study of gold and silver thread industry in Europe, have returned and are now engaged in introducing various improved devices into their gold and silver thread factory at Surat. They have applied for a loan of Rs. 15,000 from Government to pay for some of the machinery they desire to order from Europe, and as a sign of Government's encouragement of their enterprise, I had visited their factory and certainly their tour in Europe has enabled them to acquire a number of new ideas which may be brought into effect with advantage to the gold and silver thread industry in Surat. This is one of the most backward industries in its methods, and one which *prima facie* appears as if it could be very much improved by the application of even a little scientific and mechanical knowledge. In any case, the award of the scholarships is of interest as the result may afford an indication as to the best method of employing scholarships in future that is, whether it is best for an industry to have its young men sent home to complete a course of technical study and then come back to try and put their ideas into practice in the industry in which they have received technical training, or whether it is better to send home, as was done in this instance, men who have been working at the industry for some years and have a practical knowledge of the difficulties and limitations of the work as carried on at present in India. If the deputation of Messrs. Shastri and Chapadia to Europe eventually results in any substantial improvement in the gold and silver thread industry in Surat, it will be well worth while making similar experiments in other industries also, but it is as yet too early to judge correctly the results of their tour.

MINES AND MINERALS.

35. As mentioned last year, the subject of mines has been transferred to this Department. There are only three mines in the Presidency: (1) Bauxite,—Taibpur, Kapadvanj (Kaira); (2) Manganese,—Shivrajpur (Panch Mahals); (3) Manganese,—Bamankua (Panch Mahals). Only the two latter are working and raised respectively 23,518 and 16,185 tons of manganese during the year under report. The Taibpur mine did not work at all. •

36. *Coal Supplies*.—The system of X-class supplies of coal ceased from November and was replaced by a complicated system of special supplies *pro rata* on a transport capacity basis of collieries and advanced cumulative supplies in rakes and half rakes on the same basis and ordinary consumers had to make the best arrangements they could direct with the suppliers in collieries. The introduction of this system will probably make little difference in Bombay where since 1921 the coal situation has been relieved by the import of foreign coal.

37. *Assistance by the Geological Survey of India*.—The Geological Survey of India afforded considerable assistance to this Department in the year under report.

(1) Kaolin having been observed near Karalgi and Kapoli, Mr. K. A. Knight-Hallowes of the Geological Survey of India was deputed to investigate these deposits in the Khanapur Taluka, Belgaum District, and his report has been published as a bulletin of this Department. At Karalgi, there is estimated to be about 3,750 tons of Kaolin. At Kapoli no kaolin but only kaolinised felspathic muscovite schists and gneisses are found. Although the quality of the Karalgi clay is somewhat inferior to imported China Clay, probably a good market could be obtained for levigated kaolin as a sizing material for cotton cloth; but that at Kapoli, is of no economic value.

(2) Mr. Fern had analysed samples of clay—"kup" from the Khanapur Taluka and has suggested that the deposits there ought to be surveyed. Mr. H. C. Jones, Assistant Superintendent of the Geological Survey, visited the place and reported that though the kaolin appears to be of good quality, it is impossible to get much idea of the quantity, available without putting down a number of borings. Unfortunately, there is laterite present which would make these borings a long and difficult work. But in view of the importance of these deposits, the Geological Survey Department has been asked to make further investigations with a view to determine the quantity available.

(3) The question of a Geological Survey of the Runn of Cutch has been taken in hand with a view to discovering the possibilities of obtaining various products from the brine. Rao Bahadur M. Vinayak Rao of the Geological Survey visited the Runn and in conjunction with the Executive Engineer, Boring Works, drew out a programme for two bores and a line of trial pits to obtain brine. The boring had to be stopped at the beginning of the hot weather but will be resumed next cold season. Eight samples of brine from the Runn were examined at the Royal Institute of Science and the results communicated to Rao Bahadur Vinayak Rao. The importance of this work will not be really apparent until further investigations have been made and these are the province of the Government of India.

STATE AID TO INDUSTRIES.

38. At the instructions of Government, the Advisory Committee considered whether it was desirable for legislation to be undertaken to provide state aid to industries on the lines of the Madras State Aid to Industries Bill. The matter was discussed at some length and four members out of seven were in favour of legislation on the lines of that in Madras. The others considered that in the preset financial position, there was not much scope for ad hoc legislation and that any cases which were likely to arise could be disposed of by the existing powers of Government. The opinion of the committee was communicated to Government and the orders on the matter are awaited.

39. *Loan to Industrialists.*—The Advisory Committee had recommended and Government sanctioned the grant of a loan of Rs. 5,000 without interest

to Mr. L. V. Tikekar of Tikekarwadi, Sholapur, to enable him to erect buildings near his weaving factory in which he will establish a weaving school for instructions on improved looms.

The Advisory Committee had also recommended a loan of Rs. 15,000 at 6½ per cent. to the Gauri Gold and Silver Works at Surat for the development of the goldthread industry. Orders of Government on this are awaited.

EXHIBITIONS

40. *British Empire Exhibition*.—This Department was entrusted with the work of making arrangements for the participation of the Bombay Presidency in the British Empire Exhibition to be held at Wembley in 1924, and preparations were taken in hand to secure the participation of private firms and to arrange for exhibits illustrating the importance and activities of Bombay city and the Presidency, but the details of the work done will be more appropriately noticed in the next year's report after the Exhibition has been opened.

41. *British Industries Fair, 1923*.—This Department participated in the annual Fair sending home samples of sandalwood and of silks, gold and silver trimmings, kinkhab carpets and calico prints, but trade both in India and in England was not good in February and March and no orders were obtained.

42. *Red Cross Fete*.—In December 1922, a Red Cross Fete was held in Bombay and this Department organised a weaving exhibit. There were shown 16 different kinds of handlooms, warping and sizing machines, bobbin winding machines, etc. The exhibit emphasised the improved methods which were now possible over the original indigenous pit loom with throw shuttle and it excited considerable interest among the public as well as affording a useful encouragement to the members of the departmental staff.

TECHNICAL EDUCATION

43. The technical education of this Presidency is administered by the Department of Public Instruction. The Department of Industries maintains touch with it through the Director's chairmanship of the Board of the Victoria Jubilee Technical Institute and of the Committee of Direction for Technical Education and his presence on the Committees of the College of Engineering and the Royal Institute of Science.

44. In the year under report, the Victoria Jubilee Technical Institute found itself in straitened financial circumstances, as the heavy drop in the value of securities and the increase in the cost of building had rendered its funds for the completion of the new buildings at Matunga inadequate and the Board of Trustees were themselves unable to complete their programme without assistance. Government made a grant of Rs. 4 lakhs in the financial year 1922-23 and in the financial year 1923-24 have

granted a loan of Rs. 2,80,000 with a promise of consideration whether this should not be converted into a grant. The Millowner's Association also promised to contribute a special grant of over one lakh of rupees and increased their annual subscription from Rs. 2,000 to Rs. 2,500. In view of the extensive assistance required from Government it was felt that the constitution of the Board of Trustees of the Institute needed alteration to bring it into line with present day conditions and the articles of Association were modified to allow further representation to the Millowners' Association and the gradual reduction in the number of Ripon trustees. Before the close of the year, the prospects of the Institute appeared to have been satisfactorily arranged and the work on the new buildings was almost complete and the new term opened in July with the work of the Institute finally transferred from Byculla to Matunga. The Institute is now certainly the best equipped and most advanced of its kind in India, and draws students from all other Provinces. In view, however, of the heavy cost to Provincial revenues, it was felt that it is only just that preference be given in admitting students to those of the Bombay Presidency, and arrangements to this end were introduced.

45. There is nothing of importance to note in regard to the ordinary curriculum of the students of the Institute but a development of possible future consequence has been started in that, arrangements were made for classes in training apprentices belonging to the G. I. P. and the B. B. & C. I. Railways who were undergoing practical training in the Railway Workshops, by giving them classes at the Institute in the theoretical side of their work. These were started in January 1923 and so far have proved successful. Further, after discussion with the Millowners' Association, arrangements were finally made to give theoretical instruction in textiles to apprentices from the mills of the Association. These classes did not begin before the end of the year, but there is every hope that they will prove extremely useful. Such co-operation between practical work and the theoretical side cannot fail to be extremely valuable to both the parties concerned.

46. At the Dapuri Workshops, the training of apprentices was still continued with an average number of some 40 half-timers and apprentices. The scheme there has the advantage over an ordinary technical school in that lads are employed on practical work and not merely on making things for practice where the accuracy of their work does not really matter, and the more advanced boys are sent out under the charge hands to deal with outside repairs. Government have under consideration a scheme for an apprenticeship system in these workshops for boys with a knowledge of English who would take a more advanced course. On the transfer of the Dapuri Workshops to the Public Works Department, the apprentice scheme continued to be worked by that Department.

47. During the year, a report was submitted to Government on the arrangements at present in existence in the local Railway Workshops for

the recruitment and training of artisans and mechanics, foremen, chargemen and other subordinate supervising staff, with a view to seeing whether modifications were needed in the arrangements for the training of the educated middle class, and how far the local Government would be required to give financial assistance in any such scheme. The report at the end of the year was under the consideration of Government.

48. *Technical Scholarships*.—There were three holders of technical scholarships studying abroad during the year. One student after a course of Sugar Technology at the Audubon Sugar School, Louisiana, United States of America, has since been on a tour of the sugar producing areas in the West Indies, Hawaii and Java. Of the other two, one scholar is studying dyeing and bleaching at the Manchester School of Technology and the other studying tanning at the Leather Sellers' College, London. Government have now introduced the system of awarding two state technical scholarships a year irrespective of the numbers already held from previous years, and a recommendation was made by the Advisory Committee for the grant of a scholarship in chemical manufacture (pharmaceutical) and another in textiles (spinning) though awards were not made before the end of the year.

49. *Research Scholarships*.—Three scholarships in technical chemistry at the Indian Institute of Science, Bangalore, awarded in 1921, were renewed last year. The scholars were investigating rape oil, hongey oil and cashew nut oil. Of these three, two scholarships have been renewed for a further period as the authorities of the Indian Institute of Science reported that these and certain fresh investigations into certain reactions in connection with the manufacture of dyestuffs promised to be of considerable technical importance. Two research chemistry scholarships were continued during the year, one for investigation regarding a lactic acid forming yeast and the other for an investigation into casein glue at the Royal Institute of Science, Bombay. A new scholarship was awarded in the year for higher training in Electrical Engineering at the Indian Institute of Science, Bangalore.

CONCLUSION

50. The staff throughout the year worked on the whole with efficiency. The conditions referred to last year by Mr. Bell and the uncertainty regarding the future of the whole Department have made it perhaps rather difficult to carry on with enthusiasm. I would acknowledge the great assistance given by the members of the Advisory Committee who have given valuable time to the consideration of subjects on which their advice was sought.

I have the honour to be,

Sir,

Your most obedient servant,

H. F. KNIGHT,
Acting Director of Industries.

APPENDIX A.

ANNUAL REPORT OF THE ASSISTANT DIRECTOR OF INDUSTRIES.

Sir,

I have the honour to submit my annual report for the work done in the year 1922-23.

Loan of my services.

My services were again loaned to the Excise Department in the month of March 1923 for making valuation of the Dabhoda Distillery. Some of my time was taken up subsequently in calculations and correspondence pertaining to the valuation work in Bombay office.

My services were also loaned to the Registrar of Co-operative Societies to investigate into the prospects and possibilities of the following proposed Co-operative Societies :—

Co-operative Cotton Society, Parola.

Co-operative Dyers Society, Surat,

Kamgar Co-operative Mills, Bombay.

Technical Advice.

I visited the following places to give technical advice :—

Sorab Dalal Tile Works, Than Road (Kathiawar)—Helped in laying out the factory and advised on power plant and gearing.

Parola Cotton Co-operative Society, Parola (Khandesh)—Discussed the question of cotton ginning and oil milling with the directors and helped them in the selection of site, laying out the plant, etc., at Parola.

Bee-Hive Roller Flour Mill, Ahmedabad—Discussed the question of converting the drive from steam to electric, and gave useful hints with sketches.

Chandra Weaving Works, Ahmedabad—Helped in introducing Calico Printing department for printing sarees, etc.

Swadeshi Weaving Mills, Surat—Helped in introducing Calico Printing department.

Jamna Flour Mills, Bombay—Helped to find out the cause of incrustation in engine condenser and suggested remedy.

Pottery Department of School of Art, Bombay—Visited to see if the old electric motors were still serviceable.

Gamadia Girls Schools, Bombay—Helped in laying out a laundry for girls,

Kamgar Co-operative Foundry, Bombay—Investigated into the cause of high fuel consumption and suggested remedies.

Agricultural Implements Works, Satara—Helped in designing and laying out a foundry and workshops.

Bharat Tile Works, Uran—Gave general technical advice on the most efficient method of working and management.

Amalsad Saw and Oil Mills, Amalsad—Gave general technical advice and discussed the question of the utilization of wood tar produced in the gas producer.

Sanj Vartman Press, Bombay—Helped in installing a large two feeder printing machine.

Gauri Gold and Silver Works, Surat—Gave general technical advice.

Taj Engineering Works, Bombay—Investigated into the causes of bad castings produced, and suggested remedies.

Besides the above, I visited a number of small power users in Bombay such as printing presses, flour mills, ice factories, etc., introducing this department, and offering my help and advice if they needed them.

General.

I visited almost all the makers of carved sandalwood boxes in Surat and explained them the necessity of using good locks, hinges and handles for the expensive boxes and distributed free samples of nickel plated locks and hinges amongst them.

I also went round and visited various places in Surat to select and collect fancy goods for the British Industries Fair.

I wrote and published a short note on silk yarn made at Kashmere Silk Factory at Shrinagar, in some vernacular papers of Surat and Bombay and brought the Indian made silk to the notice of silk merchants. Many persons visited me while I was at Surat in October 1922 asking for more particulars of the Kashmere silk and a big merchant was so pleased with the first consignment he received from Kashmere, at my suggestion that he has now been importing the silk in large quantity and supplying to the retailers.

I demonstrated samples of calico prints made in Holland for African markets to the millowners and calico printers at Ahmedabad advising them to take up the business as Ahmedabad could produce certainly better stuff than the Holland samples.

I also demonstrated to the millowners and others, Japan made samples of various fancy piece-goods suitable for Australian markets. One enterprising millowner seemed much interested in it and took down notes with a view to making and sending a sample consignment to Australia.

I was called to Bombay in November 1922 to help in the arrangement of hand weaving demonstration section of the Red Cross Fete.

My office at Ahmedabad was closed at the end of January 1923 and I was attached to the Bombay office from February 1923.

I had also to do the investigation of several Bombay Firms of merchants and manufacturers and verify their statement submitted by personal visit and enquiries, on behalf of Indian Stores Department.

Sizing Machine Demonstration.

In the beginning of the official year the trial of the sizing machine at the Dhananjaya Hand Loom Factory of Ahmedabad not having proved successful owing to the lack of experience and practical knowledge on the part of the demonstrator, he was deputed to go to Bangalore to see and gain experience of the actual working methods of the machine at the Mysore Government Weaving Institute. He stayed there for more than a month. On his return, however, the proprietors of the Dhananjaya Factory declined to have the sizing machine tested any more. It was therefore taken to Surat and loaned to Jamshedjee Patel Weaving Factory. The machine worked at this factory for about a fortnight only but did not give satisfaction owing to the Demonstrator having returned from Bangalore without gaining any more experience and training.

The Surat demonstration had to be cut short, as this and other winding and twisting machines had to be taken to Bombay for the Red Cross Fete, where the sizing machine was not put to any actual and continuous test but its working was simply shown and explained to the visitors.

When the machine was being demonstrated at Ahmedabad and Surat the proprietors of the Swadeshi Hand Loom Factory at Amalsad had come to see it and had asked for the loan of the machine for trial in that factory. I therefore visited their factory in January 1923 and having satisfied myself that proper facilities for the actual trial of the sizing machine existed there, it was decided to loan the machine to the Amalsad factory. From my past experience of the working of the machine I had come to the conclusion that only a mill trained man having experience of a power driven sizing machine of a cotton mill could handle and work the machine efficiently, as there were several defects in the machine which could not be removed without the help of a mill trained man. I therefore insisted on having a mill trained sizing jobber in charge of the machine. An experienced man was therefore

recruited from a mill in Ahmedabad and appointed as a Demonstrator and sent to Amalsad. After overhauling the machine thoroughly and introducing some alterations and improvements the machine was put to a thorough working test, a report of which was submitted by me on the 28th April 1923. This report was afterwards given wide publicity by having it published in many vernacular papers.

The machine was afterwards taken to Surat and demonstrated in working conditions at the Industrial Exhibition held there from 20th May to 5th June. The demonstration proved a complete success at the Exhibition as a large number of people came specially to see it owing to the wide publicity that was given to the report of its test at Amalsad, and they spent a long time in the demonstration pavilion seeing and discussing its working.

I wished to have the demonstration extended in Surat as I believed, it had not been sufficiently demonstrated in a place like Surat which is considered the home of handloom industry in Gujarat ; but owing to the shortage of funds nothing could be done. The machine has however been loaned to the Pioneer Loom Factory at Ankleshwar to be tried at their own expenses.

Calico Printing Demonstration.

The demonstration of Calico Printing proved very successful in Ahmedabad. The Chandra Hand Loom Factory actually opened a department in saree printing and has been doing a good business, and I was informed that large orders from Broach and Bombay and other places were received for the printed sarees by the Chandra Factory.

I had suggested in my previous reports that the help and co-operation of Sir J. J. School of Art was necessary in introducing and creating a taste for good artistic designs amongst people. The School of Art was therefore approached who prepared and supplied in black and white some very good original designs for saree borders. These were taken to Ahmedabad and some blocks were engraved according to the new designs, and samples of sarees printed from them, were demonstrated in Ahmedabad and Surat. They were so much appreciated that the Chandra Weaving Factory and other calico printers asked for a loan of the blocks to copy from. The original designs as prepared and supplied by the Art School were in black and white only, and the colour schemes for some of the designs as selected and adopted by the demonstrator and the printers were not quite effective from an artist's point of view. I therefore visited Captain Solomon, the Principal of the School of Art, in company with the demonstrator in October 1922 and again with Mr. Chandulal, the proprietor of the Chandra Weaving Factory of Ahmedabad, in July 1923, and discussed the colouring schemes to be adopted for various designs at great length, and Captain Solomon was kind enough to make very useful suggestions and promised to submit a full report on the subject.

I have, etc.,

(Signed) F. E. BHARUCHA,

Assistant Director of Industries.

APPENDIX B.

COMMERCIAL AND INDUSTRIAL ENQUIRIES 1922-1923.

Subject of Enquiry.					Number of enquiries.
1.	Acetone. Dealers in —	..	..	..	1
2.	Acid. Acetic „ „	..	..	..	1
3.	„ Citric. Manufacturers of — from lemon juice	..	..	..	1
4.	„ Jars. Makers of — in India	..	..	..	1
5.	„ Sulphuric. Manufacture and importers of —	..	..	..	2
6.	Alcohol, Industrial. Manufacture of —	..	..	..	1
7.	Alkali deposits in Sind. Information re —	..	..	..	1
8.	Alumina. Manufacturers of —	..	..	..	1
9.	Aluminium. Ingot, sheets, Manufacturers of —	..	..	..	1
10.	Apparatus. Scientific, Dealers in —	..	..	..	1
11.	Apprentices. Admission into cotton mills	..	..	..	1
12.	Artimesa Maritima. Purchasers of —	..	..	..	1
13.	Art ware. Dealers in —	..	..	..	1
14.	Atmoid (Kieselguhr). Supply of —	..	..	..	1
15.	Barium Salt. Uses of —	..	..	..	1
16.	Barytes. Sources and Manufacturers of —	..	..	..	2
17.	Battery plates. Manufacturers of — in Bombay	..	..	..	1
18.	Bauxite. Sources of —	..	..	..	1
19.	Benzole. Dealers in —	..	..	..	1
20.	Bleaching powder. Consumers of and demand for —	..	..	..	2
21.	„ „ and caustic soda. State aid for manufacture of — by electrolytic process	..	..	..	1
22.	Bobbin plant. Information re — a proposed —	..	..	..	1
23.	Bone Mill. Estimate for a —	..	..	..	1
24.	Bone Industry. Assistance for —	..	..	..	1
25.	Bone Mills. Information re — in Central India, Rajputana and in the Bombay Presidency	..	..	..	2
26.	Boring Machine. Cost of —	..	..	..	1
27.	Bottle Stoneware. Suppliers of —	..	..	..	1
28.	Bricks — fire. Manufacturers of —	..	..	..	1
29.	Brushes. Sources and supply of bristle for —	..	..	..	1
30.	Building stones. Suppliers of —	..	..	..	1
31.	Buttons. Manufacture of —	..	..	..	1
32.	Button making. Machinery for —	..	..	..	3
33.	„ „ Information re use of cocoanut waste for —	..	..	..	1
34.	Calcined Magnesia. Suppliers of —	..	..	..	1
35.	Calcium citrate. Manufacture of —	..	..	..	1
36.	Calico prints. Supply of —	..	..	..	1
37.	Camphor. Dealers in —	..	..	..	1
38.	Carbuncles. Dealers in —	..	..	..	1
39.	Carpet. Manufacturers of —	..	..	..	1
40.	Casein. Exporters and Importers of —	..	..	..	5
41.	Casein Glue. Importers of —	..	..	..	1
42.	Castings. Iron and Brass. Manufacturers of —	..	..	..	1

Subject of Enquiry.	Number of enquiries.
43. Catechu. Manufacture in Bombay of —	1
44. Caustic soda. Importers of —	1
45. Cement. Dealers in —	1
46. Charcoal — animal. Suppliers of —	1
47. Chemicals. Suppliers of —	1
48. China Clay. Buyers and importers of —	2
49. „ „ Use of — in crayons	2
50. China ware. Manufacturers of —	1
51. Cigar-lighters. Dealers in —	1
52. Cinematograph. Commercial possibilities of — academy of dramatic art —	1
53. Cinematograph. Manufacture of — films	1
54. Coal. Indian sources of —	1
55. Coal Tar. Manufacturers of —	1
56. Coir fabrics. Dealers in —	1
57. Coir mats. Manufacturers of —	1
58. Coke. Importers of —	1
59. Common salt. Refining of —	1
60. Condensed milk. State aid for the manufacture of —	1
61. Copper Ore. Sources of —	1
62. Cotton. Statistics of production of raw and manufactured — in Hyderabad State	1
63. Cotton bedspreads. Manufacturers of	1
64. „ Belting „ „	1
65. „ Durries „ „	1
66. „ Ropes „ „	1
67. „ Sewing thread. Manufacture and suppliers of —	2
68. „ Spinning and Weaving Mills — in the Bombay Presidency	1
69. Crucibles. Manufacturers and dealers of plumbago —	2
70. Cutlery. Dealers in —	2
71. „ Industry at Wazirabad — Information re —	1
72. Dairies. Names of —	1
73. Directories. Enquiry re — trade —	1
74. Dyeing concerns in Bombay. Names of —	2
75. Dyes. Information re — supply and prices and dealers in —	7
76. Electric energy. Rates of — for industrial purposes	1
77. Fairs. Information re Organisers of — and Melas in the Bombay Presidency	1
78. Felt. Manufacturers of — in Bombay	1
79. Fertilisers. Manufacturers and suppliers of —	1
80. Fibres (cocoanut). Uses of — refuse	1
81. Fireworks. Importers and suppliers of — in the Bombay Presidency	1
82. Fisheries. Literature on —	1
83. Flax. Manufacturers of — in India	1
84. Flour. Names of — merchants in Bombay	1
85. Foundries. Brass and Iron — names of	1
86. Gins (Cotton). Manufacturers and Suppliers of hand —	2
87. Glassware. Manufacture and Importers of —	2

Subject of Enquiry.	Number of enquiries.
88. Glassware and Glass. Literature on —	1
89. Glaubers Salt. Manufacture of —	1
90. Gold and silver lace and thread. Information <i>re</i> import of —	1
91. Gold and Silver Thread. Literature on — Industry	1
92. Gold thread. Suppliers of —	1
93. Grasses. Dealers in African —	1
94. Gum. Manufacturers of —	1
95. Gypsum. Sources of —	1
96. Hats. Manufacturers of pith — in the Bombay Presidency	1
97. Hemp. Training in — and starch industries	1
98. Hosiery. Suppliers of —	1
99. Husk. Uses of Kardi — as fuel in Boilers	1
100. Ice. Information <i>re</i> — factories in India	1
101. Industrial Art Pattern Books — production of —	1
102. Inks. Dealers and manufacturers of printing —	2
103. Ink. Information <i>re</i> manufacture of — stencil, printing and marking	1
104. Instruments — Musical. Manufacturers of Indian Stringed and Musical	
105. Iron ore. Sources of —	1
106. Jewellery Manufacture. Training in —	1
107. Kerosine tinning factories in Bombay	1
108. Laces. Machinery for making boot and shoe —	1
109. Lamp black. Manufacturers of —	1
110. Lanterns (Hand). Information <i>re</i> import of —	1
111. Leather and leather goods. Manufacturers of —	1
112. Leather (Crome). Demand for — in Bombay	1
113. Lime Stone. Sources of —	1
114. Liquor Vats. Information <i>re</i> various materials used as coating for wooden —	1
115. Looms (Power). Information <i>re</i> —	1
116. Machinery. Miscellaneous enquiries <i>re</i> —	6
117. Machinery for clay manufacture	1
118. Magnesia. Manufacturers of —	1
119. Magnesium Chloride. Import of —	1
120. Manganese. Information <i>re</i> —Analysis	1
121. Manganese. Dealers in —	1
122. „ Deposits, etc.	4
123. Manjit. Suppliers of —	1
124. Manures. Manufacture of artificial —	1
125. Match Manufacture. Information <i>re</i> Literature, woods, chemical machinery and sites suitable for — Miscellaneous enquiries	25
126. Matting. Sources and supply of fine coir for wrapping	1
127. Metal. Manufacture of stationery articles	1
128. Minerals. Literature on —	1
129. Nitrate of potash. Dealers in —	2
130. Nuts. Supply of Dhupa — and butter	1
131. Ochres. Dealers in —	1
132. Oil Cakes (Mahuwa). Utilization of —	1
133. Oil cloth factories. List of —	1

Subject of Enquiry.	Number of enquiries.
134. Oil cotton seed. Extraction of —	1
135. Oil engines. Importers of —	1
136. Oil engines. Suitable type of — for industrial School	2
137. Oils, Essential. Manufacturers of —	2
138. Oil Expert. Services of an — for oil extraction plant	1
139. Oil and Gas engines. Imports of —	1
140. Oil, Ground nut. Test of —	1
141. Oil, Kapok seed. Manufacturers of —	1
142. Oil, Lemon grass. Exporters of —	1
143. Oil Linseed. Manufacturers of raw and boiled —	1
144. Oil Mills. List of — in Central Provinces and Rajputana	1
145. Oil, Mohwa. Manufacturers of —	1
146. „ „ Process for improving —	1
147. Oil Paints. Suppliers of —	1
148. Oil Palm. Importers of —	2
149. Oil Paraffin. Manufacture of —	1
150. Oil Rape. Deodorization of —	1
151. Oil Refining. Assistance to students for training in —	1
152. Oil Turkey Red. Manufacturers of —	1
153. Oil Vegetable. Adulteration of —	1
154. Oxygen. Suppliers of —	1
155. Paints. Information <i>re</i> manufacture of —	2
156. Paper. Raw Materials and plant for Strawboard manufacture	1
157. Paper. Statistical information <i>re</i> the manufacture of —	1
158. Paper. Manufacture of pulp from bhabhar and munj grasses	1
159. Paper Mill. Estimate for erecting a —	1
160. Paper Mills. —in India. List of —	1
161. „ „ Proposed erection of — in Lahore—information <i>re</i> —	1
162. Patents and designs. Procedure for obtaining —	1
163. Pencils. Manufacture of lead and coloured	1
164. Phenyl. Effective substitute for —	1
165. Pickers. Buyers of hide cuttings, broken —	1
166. Picture frame dealers in Bombay	1
167. Plaintains. State aid for dried —	1
168. Polish. Particulars <i>re</i> manufacture of white ivory —	1
169. Potassium Bisulphate. Information <i>re</i> —	1
170. „ Chlorate. Manufacturers of —	1
171. Printing block labels on tins	1
172. Printing presses. List of — in India —	1
173. Pumps — power. Suppliers of —	1
174. Railways. List of smaller and light —	1
175. Rebate on Rubber products	1
176. Red lead — Information <i>re</i> manufacturers of —	3
177. „ „ Dealers in —	1
178. „ „ Uses of —	1
179. Refrigerating apparatus. Coldstorage of fish	1
180. Resin. Suppliers of —	1

Subject of Enquiry.	Number of enquiries.
181. Rope manufacture. Use of cocoanut waste for —	1
182. Rosha grass. Lease for distillation of —	1
183. Salt. Supply of —	1
184. Saltpetre. Refiners of —	1
185. Salt Works in the Bombay Presidency	1
186. Sand for glass making. Suppliers and importers of —	1
187. Sandalwood. Export of —	1
188. Sheets (Metal). Consumers of —	1
189. Shoe. Suppliers of nails, lasts, etc., for manufacture of —	1
190. Silk Artificial. Information re manufacture of — in India	2
191. Silk. Dealers in — and manufacture of — in India	2
192. Silk — raw. Suppliers of —	1
193. „ Sources of supply of Indian Corah —	1
194. „ Sources of supply of handspun and hand woven —	1
195. „ Spinning and Weaving factories. Information re — Industry in India	1
196. „ Supply of Eri — yarn	1
197. „ Twisting machine. Information re —	1
198. Slate and slate pencils. Manufacture of — in India	1
199. Soap. Preparation of washing and toilet —	1
200. Soda ash. Importers of —	1
201. „ Bicarb. „ „	1
202. „ Silicate of „ „	1
203. Spirit, motor. Extraction of —	1
204. Spirit, rectified. Dealers in —	2
205. Starch and Fibre Industries. Training in —	1
206. Stealite Quarries. Information re —	1
207. Steel dies and moulds. Assistance in manufacturing —	1
208. Steel Importers in Bombay City	1
209. Sugar factories. Agencies in Bombay Presidency for —	1
210. Sugar factories. List of Indian —	1
211. Sugar Manufacture. Schools giving training in and Literature on —	3
212. Sugar and Molasses. Markets in Bombay Presidency	1
213. Sugar refineries. Information re Indian —	1
214. Tailoring Schools in India •	1
215. Tanneries. List of —	1
216. Tanning. Assistance in —	1
217. Tanning. Literature on —	1
218. Tanning factory. Request for lease of land for erecting a —	1
219. Tanning Materials. Prices of —	1
220. Tanning Process. Chrome alum in —	1
221. Tariff. Question of rebate on duty on improved yarn	1
222. Tariff rates. Revision of —	1
223. Tea dealers in Bombay	1
224. Tea. Importers of — from China	1
225. Technical and Industrial Institutions. Information re —	13
226. Textiles. Dealers in —	1
227. Thymol. Manufacturers of —	1

Subject of Enquiry.				Number of enquiries.
228.	Tiles, cement.	Information re machinery, etc.	.. ..	1
229.	Tiles, flooring.	Information re the prospects of industry	.. ..	1
230.	Timbers for building and cabinet making	.. ..	.. ..	1
231.	Tin.	Suppliers of corrugated sheets	.. ..	1
232.	Tins.	Manufacturers of —	.. ..	1
233.	Trade Marks.	Rules re registration of —	.. ..	1
234.	Turmeric.	Suppliers of and dealers in —	.. ..	2
235.	Varnish.	Dealers in —	.. ..	1
236.	„	Information re —	.. ..	1
237.	„	Manufacturers of —	.. ..	1
238.	Waggon and Carriage Department.	Training in —	.. ..	1
239.	Wattle bark.	Suppliers of —	.. ..	1
240.	Wax (Sugarcane).	Suppliers of —	.. ..	1
241.	Weaving factories (handloom).	List of —	.. ..	1
242.	Wood.	Supply of — for furniture making	.. ..	1
243.	Wool Spinning and Weaving.	Assistance re —	.. ..	4
244.	Wool Spinning machines.	Information re —	.. ..	1
245.	Woollen Mills.	Names of —	.. ..	1
246.	Woollen Mills.	Possibilities of the industry in India of —	.. ..	1
247.	Yarn.	Importers of —	.. ..	1
248.	„	for Hosiery. Suppliers of —	.. ..	1
249.	„	Mills Manufacturing —	.. ..	1
250.	„	Suppliers of handspun cotton —	.. ..	1
251.	Zinc ashes.	Manufacturers of —	.. ..	1
252.	Zinc Oxide.	„ „ —		1

DEPARTMENT OF INDUSTRIES

BOMBAY PRESIDENCY

ANNUAL REPORT

1924-25

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OFFICE OF THE DIRECTOR OF INDUSTRIES,

OLD CUSTOMS HOUSE :

Bombay, the 12th November 1925.

FROM

F. E. BHARUCHA, Esq., L.M.E., M.I.M.E., M.I.E.,
Director of Industries, Bombay ;

TO

THE SECRETARY TO GOVERNMENT,
General Department,
Bombay.

Subject.—Annual Report, 1924-25.

Sir,

I have the honour to submit the annual report of the Department of Industries for the year 1924-25 (1st August to 31st July).

POLICY

2. As a result of the resolution of the Legislative Council the post of the Director of Industries was abolished with effect from 19th May 1924, and I, as the Assistant Director, was in charge of the Department till the 17th June 1924 when my designation was altered to Superintendent, Weaving, and I was asked to carry on the work of the Department. My designation as Superintendent, Weaving, was altered to Superintendent of Industries on the 10th September 1924 and on the 14th of July 1925 the appointment of the Director of Industries was recreated and I was appointed to hold it.

3. I was, therefore, in charge of the Department of Industries under different designations throughout the year and the following activities of the Department were under me :—

- (1) Supply of commercial intelligence to private enterprises.
- (2) Professional or technical advice and assistance to minor industries.
- (3) Demonstration in cottage industries, especially in weaving.

4. The above activities were under dual control, the weaving section being under the control of the Co-operative Department, and the industrial activities under the control of the General Department.

STAFF

5. All the old clerks of the Department having been disbanded and dispersed in May 1924 I had under me only one clerk in the beginning. One typist was subsequently added. Besides these two clerks in the Bombay office I had four weaving assistants and one dyeing and calico printing assistant under me and a staff of 33 weaving masters, demonstrators and their assistants all working in the mofussil. In the absence of sufficient clerical staff to cope with the activities under me as enumerated above, I had to work under great difficulty throughout the year, which can be gauged from the bulk of correspondence work done by my office during the year. Total number of letters received and despatched by this Department during the year under report was 3,120 and 2,742, respectively, as compared with 5,877 and 5,775 in 1922-23 and 5,609 and 5,740 in 1923-24.

EXPENDITURE

6. The expenditure incurred by the Department during the financial year 1924-25 and the two preceding years has been as follows :—

				Rs.
1922-23	..	..	..	2,39,000
1923-24	..	..	..	1,37,885
1924-25	..	..	..	65,800

7. In 1924 the Legislative Council voted Rs. 1,11,000 *plus* Rs. 9,000 non-voted for the Department of Industries. As some of the activities of this Department were transferred under certain heads the grants for them were also transferred to their respective heads, leaving Rs. 84,685 for this Department, out of which Rs. 65,800 were spent. This includes the salary of the Director for two months and a half and of the whole of the old staff for three months. Although the grant for the weaving section was transferred to 34—Agriculture, I have included it in the above expenditure under 35—Industries.

TOURING

8. For want of sufficient clerical staff under me and in the absence of any responsible assistant who could look after the office work in my absence, I could not do much touring during the year. However,

I was on tour for 52 days during the year and my tours included the following places :—

Barsi, Poona, Satara, Than Road (Kathiawad), Ahmedabad, Ankleshwar, Malegaon, Sholapur (three times), Bijapur, Nasik, Sinnar, Ahmednagar, Patherdi, Tukwada, Surat, Broach, Borsad and Karamsad.

INSPECTION AND INVESTIGATION ON BEHALF OF STORES PURCHASE DEPARTMENTS

9. Workshops, showrooms, shops and godowns of 14 firms in Bombay were inspected by me during the year on behalf of the Stores Purchase Department of the Government of the United Provinces as they had applied for registering their names as approved contractors and suppliers of stores, and reports were submitted.

DEVELOPMENT OF INDUSTRIES

10. The unusual depression in trade continued throughout the year but owing to the rise in the exchange and fall in the prices of machinery four new cotton spinning and weaving mills were projected at Barsi and one at Sholapur. Two of the new mills at Barsi are already under construction. The New Oil Mills, Bombay, the largest of its kind in the Presidency, stopped work owing to financial stringency, and another oil mill in Bombay changed hands. The oil industry like the textile industry did not fare well during the year and there are no signs of any extensive industrial developments in the near future. Two new cotton mills—one at Dhulia and one at Chalisgaon—completed their construction.

11. There are no circle or district officers attached to this Department through whom information regarding new industrial developments in the various districts of this Presidency could be obtained. I have, however, been able to collect information about some new industrial ventures which I give below.

12. **Satara Industrial Works** have completed their extension and are now equipped with an up-to-date plant for manufacturing agricultural implements and small machines for rural industries.

13. **Ogale Glass Works (Karad)** have largely extended their works and have added a large up-to-date and well-equipped workshops for manufacturing hurricane lanterns complete, including a plant for manufacturing corrugated straw boards for packing the lanterns and other glass articles turned out by the factory.

14. **Pioneer Magnesia Works (Kharaghoda)** did not do much business in manufacturing and selling magnesium chloride prepared from the waste mother liquor or bitters of Prichard Salt Works at Kharaghoda, owing to the formidable rivalry of the imported German stuff. The

works applied to the Tariff Board for protection but it was negatived. The Company managing the works is now working on a profit sharing basis with the Government of India instead of paying a fixed royalty.

15. Sorab Dalal Tile Works (Than Road, Kathiawad).—The manufacture of flooring tiles of the Minton type having failed, the works devoted their attention to the manufacture of acidproof jars large and small and succeeded in putting them on the market in Bombay, Gujarat and Kathiawad. The jars are now in great demand and the proprietor contemplates opening a branch factory in the suburbs of Bombay in the near future. They also manufacture fire-bricks and allied goods.

16. Bharat Tile Works (Uran) have converted their factory from hand-driven to a power-driven one by installing new and most up-to-date labour-saving machines for manufacturing cement flooring tiles. Their tiles are now used in many public and private buildings of Bombay and compete fairly with similar imported tiles in quality and price.

17. Godrej Soap Works for manufacturing toilet soap have been shifted to a large and specially built buildings on DeLisle Road, Bombay, and will shortly be producing toilet soap in larger quantity from purely vegetable stuff for which there seems to be a good demand.

18. Hosiery Works.—The Katrak Hosiery Works, Bombay, and the Bharat Knitting Works, Poona, are doing well and have been equipped with the most up-to-date automatic power-driven machines. The Poona factory has been converted into a joint stock company to enable it to extend its scope with increased capital.

19. Gauri Gold and Silver Works 'Company, Surat, has been extended and equipped with some up-to-date machines for gold and silver wire drawing, gilding, lametta, tinsel and other articles used in gold and silver embroidery work, and is now electrically driven throughout. Messrs. Shastri and Chhapadia who were given scholarship by this Department to visit Europe and gain first-hand knowledge and experience in the manufacture of these articles seem to have derived much benefit from their excursion abroad and have made many alterations and improvement in their works on their return.

20. Great Eastern Engineering Works, Bombay, have been largely extended during last year and equipped with some very good high speed tools for manufacturing small industrial machines as has been stated under the heading of " Manufacture of Machinery " in this report.

MANUFACTURE OF MACHINERY

21. Two large works have lately been established in this Presidency for manufacturing machinery suitable for agricultural and small industries. These are the Satara Industrial Works at Satara and the Great Eastern Engineering Co., Ltd., at Bombay.

22. The Satara Industrial Works manufacture agricultural implements such as iron ploughs of various kinds, sugarcane crushers, rope-making machines, etc. They have largely extended and equipped their works with modern tools during the year, putting down a large gas engine to drive their workshops. The ploughs and other articles manufactured at these works are well spoken of and are in good demand.

23. The Great Eastern Engineering Company have lately put down a large workshop and foundry at DeLisle Road, Bombay, occupying an area of about 60,000 square feet, and are well equipped with high speed machine tools for manufacturing cotton gins, corn grinding mills, rotary oil mills, sugar cane mills, pumps, ground nut openers, saw benches, etc.

24. Manufacture of machinery in this country has been almost entirely neglected partly through lack of scientific knowledge and partly through lack or dearth of raw material. Now as large iron and steel works have been permanently established in this country and as well-trained engineers are also available, there is no reason why this industry should not expand and flourish in this country. The special features of some of the machines turned out by the above named works as compared with those of the imported ones are that practical experience gained in this country on the spot under local labour and local circumstances has been brought to bear on the designs and constructional details of these machines. As, for instance, large accumulated experience is now available in this country regarding the difficulties and defects that often come across in working the imported cotton ginning machines which if made in this country could be greatly improved so as to eliminate them. Similarly rotary oil ghanis, flour grinding mills, etc., must be designed to suit and answer the local demands and local circumstances which are often different in various districts.

MATCH FACTORIES

25. With a view to protect the match industry of this country Government of India levied an import duty of Rs. 1-8 per gross boxes of matches in 1922. In order to evade paying this duty some match factories were set up in the suburbs of Bombay for manufacturing matches from imported ready made undipped splints and veneers for boxes, the process of dipping or providing the chemical tips to the imported splints having been carried out locally by hand work.

26. Later on in order to further protect our match industry using indigenous wood Government of India levied duty on splints and veneers imported from foreign countries, the import duty on the finished matches remaining the same. The Bombay factories, therefore, ordered out machinery last year and began to manufacture matches by power from logs of matchwood imported from Sweden, Finland and Japan, and some of the factories worked day and night last year in order to take the fullest

advantage of the protection given to the industry by the heavy import duty which amounted to 150 to 200 per cent. on the cost of matches.

27. There are now 14 match factories in this Presidency, seven of which have been established in the suburbs of Bombay. Their approximate total output is estimated at 30 to 40 lakhs gross boxes annually, and except three or four factories that use indigenous wood from our forests all the others import and use match wood logs from foreign countries. According to the customs authorities match wood logs worth Rs. 4,37,752 were imported from foreign countries into Bombay port during the year 1924-25 on which the import duty was paid at 15 per cent *ad valorem*.

28. A circular letter was issued by me to all the match factories asking their requirements of match wood and it was roughly estimated from the replies received that the total quantity consumed by the factories would be about 20,000 tons annually.

29. I received several enquiries regarding information on match wood available from the forests of this Presidency, but in the absence of any reliable data I could not supply them and referred the applicants to the Forests authorities. The notes and classification of some kinds of match wood given in "Prospects of Match Industry" by Mr. R. S. Troup, Imperial Forest Economist to the Government of India, is now very old and obsolete as it was published about sixteen years ago. An abstract was published from these notes by this Department in the form of a small pamphlet for the benefit of the enquirers, but it seems to have not satisfied the demand as it does not give the fullest information. The forest department was therefore asked to revise and supplement these notes, but the very little extra information that has been supplied is practically of no use to the industry.

I am of opinion that in order to satisfy the growing demand for more accurate and reliable information on the subject, it is necessary to have our forests explored and reported upon by a match technologist after having actually tried in a match factory the various species of match wood that may be discovered. This has already been done by the Governments of Bengal and Bihar and Orissa. Much important and original research work can be done in this subject with the help of a match technologist and with the co-operation of the forest and this departments. Government has, therefore, been requested to arrange for a suitable and sufficient supply of match wood from our forests, as far as it may be practicable through the forest department which is now investigating the whole problem.

POTTERY

30. The proprietor of Sorab Dalal Tile Works at Than Road (Kathiawad) complained to this department regarding the undue competition set up by the newly started semi-commercial pottery factory

at Sir J. J. School of Art, Bombay, in the manufacture of acid proof jars. As the control of the pottery section was transferred to another department last year, the complainant was directed to apply to that department, which he did. I was then asked by Government to investigate into the complaint and submit a report, which was done, with the result that the semi-commercial pottery factory at Sir J. J. School of Art has been stopped.

TECHNICAL ADVICE AND HELP

31. I visited the following places to give technical advice and help.

Lokmanya Mills, Barsi.—Helped in laying out the whole mill on the most economical and labour saving lines. Also specified and helped in the selection of the power plant, humidifying plant, etc.

Satara Industrial Works.—Helped in designing and laying out the whole works and subsequently its extension. Advised on the most economical way of producing power and on the method of the reduction of foundry slag and waste.

Sorab Dalal Tile Works, Than Road (Kathiawad).—Advised on the best method of firing the furnaces for producing uniform heat throughout and on the repairs of the furnaces that had cracked.

Pioneer Silk Works, Ankleshwar.—Gave general technical advice on silk weaving and power plant.

New Oil Mills, Bombay.—Gave general technical advice on various matters and on boiler setting, etc.

Jam Mills, Sholapur.—Inspected the power plant and the mill and submitted a report as to their condition and necessary improvements needed.

Criminal Tribes' Settlement, Sholapur.—Advised in the laying out of a hand weaving factory on the most modern lines.

Bharat Tile Works, Uran.—Advised on converting the hand machines into power driven ones and gave general technical advice.

Tukwada Co-operative Society.—Gave technical advice and instructions on the pumping plant for agricultural purposes.

S. P. Sagar's Sugar Refinery, Bombay.—Gave technical advice on the method of working and converting the factory into a power driven one.

Godrej Soap Works, Bombay.—Gave general technical advice on the layout and power for the newly constructed buildings on the DeLisle Road.

Gowarikar & Co.'s Iron Works, Sholapur.—The works were inspected on behalf of the Registrar of Co-operative Societies and a report was submitted to him on the valuation of the plant, and stock and buildings, etc.

Great Eastern Engineering Co.'s Works, Bombay.—Gave general technical advice on the most modern methods of doing work.

32. I was invited to visit Karachi to give technical advice and help to various industrial concerns of a firm, but I could not spare myself for the journey for want of an assistant under me, who could look after office work in my absence.

33. Besides the above visits a large number of people called and visited me in my office to consult me on various industrial and technical and commercial matters, and I was often asked to accompany them to the offices or showrooms of machinery dealers to help them in selecting machinery or power plant for their industrial concerns. Similarly technical advice and opinions were given to a number of applicants from various parts of the Presidency on various engineering, technical and industrial subjects, such as selection of power plants for new factories, the layout of machinery, defects in machinery, water softening plant, pumping water, scheme for a technical school for Mahomedans, re-organisation and layout of the workshops of the Ratnagiri Technical school, designing and planning of the Kareli Co-operative Society and selecting power plant and machinery for the same, best rope driving arrangement for the Jaishankar Mills at Barsi, etc., etc.

ROSHA OIL

34. Nothing has been done so far in working and demonstrating the new still for the distillation of rosha grass oil since its arrival from England in 1923 as the contract for collecting the rosha grass has been given to a syndicate. It is however proposed to conduct the experiment departmentally next cold season, if sufficient quantity of grass and facilities for the experimental demonstration are available.

FISH OIL

35. The sardine oil plant at Majali (District Karwar) remained idle throughout the year for want of adequate supply of fat sardines suitable for extracting the oil. It is proposed to make a demonstration next cold weather if the supply of suitable sardines is available.

BUTTON MAKING MACHINERY

36. The machinery for manufacturing buttons from horns, bones and some kinds of dried nuts, that was designed and made for this Department in the Dapuri Workshops, Poona, was loaned to the Department of Industries, United Provinces, for experimenting purposes, but the machinery was not put to work during last year. It appears however from a letter recently received that the machinery will shortly be put to work in the United Provinces.

STATE AID TO INDUSTRIES

37. Four applications were received during the year requesting for financial help from Government through this Department. One application was from a very large industrial concern asking for a loan of several lakhs of rupees and offering their whole property as a mortgage to Government, but as the industry that was carried on by the concern was not a nascent one and as the concern could have easily secured a loan from a bank or private financier, nothing could be done in the matter. The applications of two other firms could not be considered as they were not willing to offer their property by way of security while the fourth one is still under consideration.

38. A loan of Rs. 15,000 was sanctioned to an industrial concern in Surat in 1923, and half the sum was borrowed by them, but as they subsequently differed on certain clauses in the mortgaged deed to be executed by them they declined to receive the balance last year and refunded Rs. 7,500 with interest which they had received in the beginning.

COMMERCIAL AND INDUSTRIAL INTELLIGENCE

39. A representative list of enquiries received during the year is given in Appendix B and shows their general nature and the magnitude of work done in digging out the information from various sources and supplying the same to enquirers with the help of only one clerk under me. This is the most popular section of this department, and, in spite of the general depression in the trade, people did not fail to avail themselves of the services that this department could render in supplying information on wide and varied commercial and industrial subjects as well as in engineering and technical matters.

40. In addition to the enquiries enumerated in Appendix B as many as 112 enquiries on other miscellaneous subjects were received and disposed of which cannot be strictly classed with commercial or industrial ones.

41. As a rule enquiries from overseas firms for trade connections with Bombay merchants were passed on to H. M. Trade Commissioner, and those from Indian merchants for trade connections with foreign countries were passed on to the Director-General of Commercial Intelligence and Statistics, Calcutta.

CHEAP POWER

42. A petition was received by me from several owners of small industrial factories of Poona who use electrical energy supplied by the Poona Electric Supply Co., Ltd., to ask the company to reduce the rate of power-supply from $2\frac{1}{2}$ annas per unit to $1\frac{1}{4}$ annas. This question was referred to the Electrical Engineer to the Government of Bombay for opinion who

reported that it was not possible for the Company to reduce the rate as the Company was not making a reasonable return on the capital invested.

43. This opens up the most important question of supplying cheap power to small industrialists wherever it may be possible in this Presidency. Bombay with its huge schemes of supplying hydro electric energy ought to be able to supply cheap power to small industrial factories, but the Bombay Electric Supply and Tramways Co., Ltd., charge 2 annas per unit for installations of from 5 to 10 brake horse power, while the rate charged by Messrs. Tata Sons, Ltd., for supplying electrical energy to large cotton mills from their several hydro electric works range from '5 to '9 of an anna per unit. It appears that the Tramways Co. now purchase electrical energy in bulk from Tata Sons, Ltd., at a very low rate of '425 annas and after using a large quantity in their own work, sell the surplus to small industrial concerns at a rate varying from 1'5 anna to 2 annas per unit. Of course the Tramways Company use their own transformers and mains, etc., for distributing the power, and they are therefore entitled to a reasonable profit on their retail business, but it is for consideration if the rate of retail supply charged by the Company could not be reduced so as to help the small industries.

44. In motors of small power and low efficiency one unit of current supplied at the terminals of the motor produces one brake or actual horse power at the driving pulley. In large power motors one unit replaces about 1'25 horse power.

45. With the price of crude fuel oil @ Rs. 65 per ton at present in Bombay the cost per one horse power per hour in a crude oil engine comes to from '75 to 1 anna. This engine is, therefore, a formidable rival of electrical energy in Bombay, and, had it not been for the restrictions to its installation in Municipal areas, the crude oil engine would have been more widely adopted by small industrial concerns in Bombay in spite of various advantages and facilities offered by the electrical drive. For varying and intermittent loads, however, an oil engine drive is not so economical as an electrical one.

46. I am of opinion that much impetus and help could be given to small industrial factories in Bombay and its suburbs, if it can be arranged to supply electrical energy at from 1 to 1'5 annas per unit.

47. The following pertinent remarks appear on the subject on page 137 in paragraph 207 of the Report of the Industrial Commission :—

“ In towns and cities where there is a public electric supply the use of electro motors for driving small machines has been but very slightly encouraged. We have not the least doubt that they will ultimately prove most helpful to the artisans and will greatly facilitate the introduction of a more organised system of production.”

COTTAGE INDUSTRIES

48. The most important cottage industry of this Presidency is the hand weaving, because almost a third of the population following cottage industries in this Presidency depend wholly or largely on hand loom weaving and allied crafts.

49. Hand loom industry is not dying as is wrongly believed but it is actually flourishing and expanding. The importance and magnitude of this industry can be gauged from the fact—which can be proved by actual figures—that of the total cloth consumed in this country about one-third is produced on hand looms, about one-third on power looms, and about one-third is imported from foreign countries.

50. **Hand Weaving Industry.**—The Department of Industries, therefore, is paying particular attention towards helping and reviving this industry by demonstrating and introducing the most modern and improved methods of producing hand woven goods by means of improved flyshuttle looms and other preparatory appliances such as hand driven machines for winding, warping and sizing, and mechanical dobbies for weaving patterns or borders.

51. The type of hand loom which has become the most popular amongst the weaving community and has given the greatest benefit to the weavers is the flyshuttle loom by means of which the production of a weaver is increased by about 40 per cent. as compared with that on the old fashioned throw-shuttle loom. Besides giving the increased production the flyshuttle loom enables a weaver to weave a cloth of greater width and use longer warps. This loom as well as the mechanical dobby are almost entirely made of wood in this Presidency, and their increasing demand has set up a new subsidiary industry for manufacturing them in various weaving centres.

52. These improved methods and appliances are introduced amongst the hand loom weavers in two ways, *viz.*, by means of weaving schools and weaving demonstrations.

53. **Weaving schools** are opened in important weaving centres or large towns and are usually equipped with eight to ten flyshuttle looms—khadi looms for beginners and saree and fancy cloth looms for more advanced pupils. Boys belonging to the weaving community are admitted into these schools to whom instructions are given in weaving various kinds of plain and fancy cloth as well as in pattern and dobby work, and the advantages obtained by using improved healds, reeds, shuttles, pirns, etc., are explained and shown to them practically. When available, sons of weavers who have received primary education up to vernacular standards III and IV are given preference for admission so that they may easily understand the simple arithmetical calculations in the art of weaving which is taught in these schools; but provision is also made for giving

preliminary lessons in simple arithmetic to those who require. No fees are charged but a monthly stipend of Rs. 3 is paid to each boy of the weavers' community for the first three months, and regular attendance and skill in working are encouraged by the award of small monthly cash prizes. As the boys advance in practice they produce marketable goods, and the proceeds of their production are paid to them after deducting the cost of yarn, or they are permitted to bring their own yarn and weave on the improved looms under the supervision of the teachers. All help and encouragement are given to the pupils to deposit their earnings in the Post Office Savings Bank so that they may be able to buy a flyshuttle sley and a dobbie and set up for themselves when they leave the school.

54. These schools are placed under a headmaster and an assistant master and are supervised by the weaving assistants of this department who travel almost continually from place to place. Local committees of prominent persons of the particular place are also appointed to visit and supervise the work of the school.

55. These schools are allowed to be kept in a place for a year or two, and, when the object of introducing a sufficient number of improved appliances amongst the weavers of the surrounding locality is achieved, the school is closed and transferred to another weaving centre.

56. **Weaving Demonstrations.**—These are peripatetic, travelling from one weaving centre to another, and are arranged on a smaller scale than weaving schools in small villages specially. The object of these is to demonstrate the working of the flyshuttle loom to the weavers using throw-shuttle ones and to enable the weavers to receive practical instructions under the demonstrator on flyshuttle sleys. The demonstrator is posted to a weaving centre with two flyshuttle looms, on one of which he works and demonstrates the improved method of weaving the kind of fabric usually woven in the village on old throw-shuttle looms, and on the other he invites weavers to come and practice for themselves and gain special instructions as to the mode of working. These demonstrations usually are held from six to twelve months in a place till a sufficient number of flyshuttle looms is taken up by the weavers, which would serve as an object lesson for other weavers to copy. These weavers have a deep-rooted conservatism against adapting any new methods, which takes a long time to break down, and in this way the flyshuttle sley continues to spread slowly but surely amongst the weavers of a particular centre.

57. **Situation of weaving schools.**—In the beginning of the year under report there were five weaving schools held at Parola (East Khandesh), Patherdi (Ahmednagar District), Bijapur, Betgiri (Dharwar District) and Sinnar (Nasik District). They all helped towards introducing the flyshuttle looms in the surrounding districts. The Sinnar school was, therefore, closed and transferred to Vinchur (Nasik District) in November 1924

as the result was satisfactory. The number of flyshuttle looms introduced in Parola, Patherdi, Bijapur, Betgiri, Sinnar and Vinchur are 250, 75, 62, 48, 150 and 60 respectively.

58. **A Weaving School for Agriculturists.**—At the suggestion of the Provincial Board of Agriculture and as per sanction obtained by G.R., G.D., No. 2786 of 20th April 1923 the experiment of training agriculturists to take up weaving as a spare time occupation was carried on in Hoshalli (Dharwar District) till April 1925. After having introduced about a dozen hand looms amongst the agriculturists there, the school was transferred to Benkanhalli (Belgaum District) on the agricultural farm of Mr. V. S. Phaterpekar. There are eight looms working in the school and pupils from agriculturists only from surrounding villages attend the school. They are taught to weave plain cloth only such as gudar, khadi, dhoti, shirting, etc.

59. A full and interesting report of the working of this experimental school for the past three years is given in the Appendix A at the end of the report.

60. **Situations of Weaving Demonstrations.**—Seven demonstrations were in progress during the year in Central and Southern Divisions. They were situated at Pimprala (Khandesh District), Barsi (Sholapur District), Alur (Dharwar District), Kerur (Bijapur District), Guralhusar (Belgaum District), Deshnur (Belgaum District) and Rajapur (Satara District). These are small villages and the number of flyshuttle looms introduced upto now is 30, 18, 54, 48, 7, 4 and 3, respectively. The weavers of some of the places in the Southern Division where the demonstrations were held requested to have the period of demonstrations extended from six months to one year which was granted.

61. In the year under report the demonstration at Broach was closed and transferred to Barsi in April 1925, that at Ond was transferred to Rajapur in November 1924, and that at Guralhusar was transferred to Deshnur in June 1925.

62. **Weaving schools and demonstrations in Gujarat.**—About two years ago Government approved of a scheme for extending the operations of helping the hand loom weaving industry in Gujarat, and sanction was obtained to open schools and demonstrations on the 25th August 1924. Thereupon one of the weaving assistants was asked to visit and select certain places, and a Gujarati knowing weaving assistant was engaged to organise and open weaving schools and demonstrations with necessary staff and equipment. In the year under report three schools were opened at Surat, Broach and Bulsar, and three demonstrations were opened at Abrama (Surat District), Borsad (Kaira District) and Karamsad (Kaira District). Although these schools have been in operation for a few months only during the year and the staff engaged is new, they have done some good work and aroused interest amongst the weaving community

by introducing flyshuttle looms in their vicinity as given below, and better results are expected as the work progresses.

Surat	..	..	..	6 Looms
Broach	..	..	..	16 „
Bulsar	..	..	..	12 „
Abrama	..	..	..	7 „
Borsad	..	..	..	8 „
Karamsad	..	..	..	35 „

63. Demonstrations of hand sizing machines, automatic looms and other modern preparatory appliances for hand weaving.—About three or four years ago a demonstration in the improved method of preparing a sized warp by means of a hand worked yarn sizing machine imported from the Weaving Institute of Bangalore was opened at my suggestion at Ahmedabad ; but it failed for various reasons, one of which was that the machine did not suit the local circumstances and requirements, and another reason was that the demonstrator was not an experienced hand. I took the machine subsequently to Amalsad and placed it in charge of a mill-trained mistry who carried out many improvements in the machine at my suggestions, and it worked successfully. The machine was afterwards taken to Dhulia, and, taking advantage of the skilled labour and facilities available there, an altogether new machine was designed and evolved under my supervision. The machine attracted much attention of the hand weavers, and a weaving factory owner of Faizpur (Khandesh) purchased it for his own use. This warping and sizing machine is suitable for a weaving factory containing from 15 to 20 hand looms but is too expensive and too large for an individual weaver. Taking encouragement from this success, another larger machine was designed and built for this Department at Dhulia and taken to Sholapur last year, where hand weaving is largely done on factory scale by some of the wealthy weavers. This machine has aroused so much interest among the weavers of Sholapur that they have repeatedly applied to me to extend the period of the demonstration at Sholapur. Even a weaver (factory owner) from Rajkot went specially to Sholapur to take down sketches and particulars of this machine and stayed there for a fortnight to learn its working.

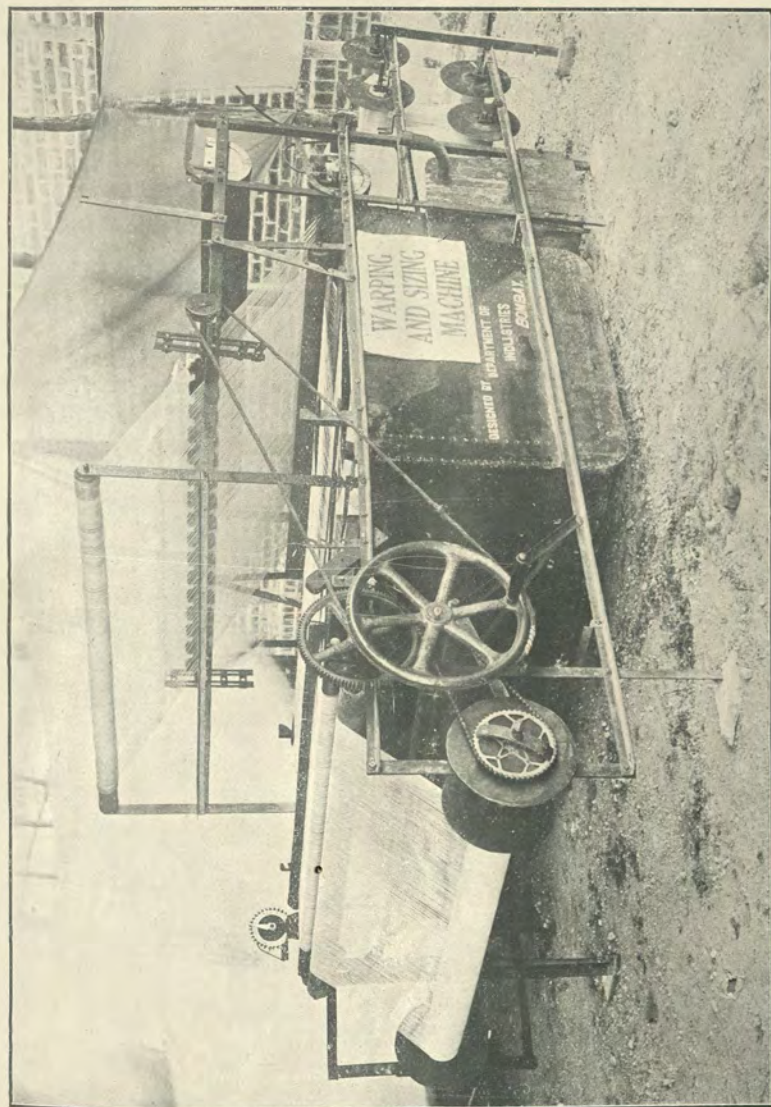
64. The story of the success of the warping and sizing machine having reached Surat, I received last year a petition signed by about 80 weavers of that place to take the demonstration there for their benefit. Surat has, therefore, been earmarked for such a demonstration after having finished at Sholapur.

65. Besides the large warping and sizing machine which can size, dry and prepare a warp of about 2,400 ends of 120 yards length in one operation of 8 hours, a small cottage warping and sizing set suitable for



Cottage Hand Sizing and Warping Machine (suitable for an individual weaver).

(See page 14)



Large Hand Sizing Machine (suitable for a hand-loom factory).

(See page 14)

individual weavers has also been designed, made and demonstrated at Sholapur, and it has become so popular there that several weavers of that place are having it copied and made for their own use in their cottages.

66. But this sort of experimental and research work cannot be done in a peripatetic demonstration, and what has been done upto now has been done under great difficulty and inconvenience. I had to go and stay at Amalsad for a fortnight and go to Dhulia and Sholapur several times to advise and help the weaving assistant in charge of this experimental work and I saw the difficulties he worked under. Much more can be done in the direction of designing and evolving bobbin and pirn winding machines, finishing machines, etc., and in improving the preparatory methods of hand weaving industry. This can only be done in a well-equipped weaving institute permanently established in a large and important weaving centre such as Surat. I have already got a large quantity of the requisite equipment in the demonstration of the sizing machine and automatic looms now held at Sholapur, which can be easily transferred to the institute. Besides the sizing and warping machines and bobbin and pirn winding machines all worked by hand, the Sholapur demonstration contains various kinds of looms, such as the English Hattersley loom worked by feet like a sewing machine, the Koshti Kalyan loom (copy of the original Churchill loom of Ahmednagar), the salvation army loom and the flyshuttle looms of various types. All of these would make a very interesting and instructive collection of the most modern and improved appliances in the art of hand loom weaving with the addition of a jacquard loom for weaving high class patterns and doing fancy work in a permanent weaving institute.

67. **Dyeing and Calico Printing Demonstration.**—Dyeing and calico printing industry is a cottage industry, perhaps next in importance to hand loom weaving, as a large number of persons are engaged in it. Calico printing is mostly done in Ahmedabad district and Sindh, but dyeing of cloth and yarn is carried out in all important towns and villages. Persons engaged in these handicrafts are almost wholly illiterate and do their work according to their primitive and ancient methods, which are often uneconomical and non-efficient.

68. A demonstration in these crafts on the most modern and scientific lines is held by this department with the help of a qualified dyer and printer for the benefit of dyers and printers in their own localities in important centres of this Presidency, and they are invited to attend the demonstration of the new methods and learn them. The dyers and printers are allowed to take any samples to the demonstrator in his laboratory and request the demonstrator to show them the methods of reproducing them, and the demonstrator frequently visits the cottages of the dyers and printers to show them the defects of their primitive methods and and teach them the new ones. In this way considerable interest is aroused

in this demonstration, old prejudices are broken down and new and up-to-date methods of dyeing and printing are making slow but sure progress.

69. In the beginning of the year the demonstration was at Malegaon which is a large centre for hand-loom industry and yarn dyeing, almost the whole of the population of the place having been engaged in these two crafts and allied work. A large quantity of dyed yarn is imported into Malegaon from Bombay and Petlad dye houses, though some quantity is dyed locally by native dyers who use indigo and alizarine dyes but do not know the modern methods of dyeing. Malegaon consumes a large quantity of Turkey red yarn dyed with alizarine and blue or black yarn dyed with indigo which are woven into sarees suitable for Deccan women. The demonstrator introduced a process of dyeing yarn by sulphur and naphthol dyes and other methods hitherto not known to Malegaon dyers, and it aroused much interest in the beginning as about 40 dyers learned the new methods and began to practise them in their dye houses. Feeling jealous of the success and economy of the new methods some old local dyers who would not learn the new processes started an agitation backed up by some influential and wealthy merchants dealing in imported dyed yarn against the demonstration opened by this department with the result that the dyers abstained from attending the demonstration.

70. I visited Malegaon in November 1924 and interviewed several local dyers and learnt from them that Bombay and Petlad dyed yarn was in great demand at Malegaon and as some local merchants had secured sole selling agencies in these lines they thought that if some local dyers learned the art of dyeing yarn to the same shade and colour as the yarn imported and sold by them their trade would be ruined. They therefore instigated the local dyers to boycott the demonstration of this department. The dyers called a meeting of their Jamat (fraternity) and resolved that no dyer should dye yarn according to the new methods demonstrated and introduced by this department, and he who did it was made liable to a fine of Rs. 15. I was informed that even the yarn merchants refused to supply undyed yarn to such dyers and the cloth merchants would not purchase goods woven from yarn dyed according to the new methods.

71. About a dozen dyers who had learnt the new methods and established in the bazar found themselves boycotted. Some of them told me that owing to the competition set up by the cottage dyers with dealers in the mill dyed yarn, the latter reduced their prices which ultimately benefited the handloom industry.

72. The dyers working with the new methods persisted and applied to this department for extending the period of the demonstration which was done, and the boycott died its natural death. The progress at Malegaon

was therefore satisfactory and the demonstration was closed there in February 1925 and transferred to Sholapur at the request of Sholapur District Weavers' Central Co-operative Union. While at Sholapur the demonstrator resigned and opened his own dye house in partnership with some other dyer. Another qualified demonstrator was, therefore, recruited and engaged and several dyers as well as the weavers have already taken advantage of it.

73. The demonstrator has been regularly visiting the cottages of the dyers and helping them in improving their methods and the later reports from Sholapur are very satisfactory.

CONCLUSION

74. In spite of the existence of this department for the past six years I have come across many industrialists and others who did not know of its existence. This is because no district circle officers and industrial surveyors have been appointed to tour round to collect information regarding the manufacturing as well as the cottage industries of each of the districts of this Presidency and thus bring the industrialists and cottage workers in intimate contact with this department by offering help to those who may be in need of it. There are many industrial districts in this Presidency which no officer of this department has ever visited, and it is not the fault of the people if a large portion of the population of this Presidency do not know what this department is doing or has been created for. The small industrialists are in greater need of technical help and advice than the owners of cotton mills and other large and well established concerns. There is a large number of small power-driven factories in towns and villages such as cotton ginning and pressing factories, oil mills, flour mills, ice factories, rice mills, etc., which are usually driven by the cheapest and the most out-of-date power plants, placed in charge of engineers who are willing to serve on the lowest wages. These plants are therefore fuel eaters of the worst type and could be improved much or replaced by the most modern and economical ones with the help and advice of this department, if desired by the owners. Two circle officers were actually appointed by this department and kept under training in the Dapuri Workshops for about two years, but owing to retrenchment they were not confirmed.

75. It is also necessary to have a complete industrial survey made of the whole Presidency to find out what arts and crafts or cottage industries and other manufacturing industries by power-driven factories are carried on, and what facilities for obtaining raw material, demand for the finished products, and prospects for expanding exist in various districts. Much more similar useful information could be collected if the industrial survey is carried out on proper lines with the help of circle officers with technical knowledge and experience.

76. The staff on the whole worked with efficiency, though the staff in the Bombay office was much over-worked.

I have the honour to be,

Sir,

Your most obedient servant,

F. E. BHARUCHA,

Director of Industries

APPENDIX A.

HAND-LOOM WEAVING FOR AGRICULTURISTS

1. At the meeting of the Provincial Board of Agriculture held at Poona in 1921 I had submitted a paper at a very short notice on rural secondary occupations and cottage industries in which I had laid a great deal of stress on hand-weaving as the most suitable one for the agriculturists amongst other cottage industries.

2. The Honourable Sir Chunilal V. Mehta, (the then) Minister in charge of Forest and Excise, Bombay, who had presided over the meeting of the Board, subsequently asked the opinion of the Director of Industries who suggested that the introduction of hand-weaving amongst agriculturists should first be tried in a rural village to be selected by the Department of Agriculture.

3. The suggestion was accepted and the Director of Industries approached Government on the 27th September 1921 to sanction additional weaving staff and incidental expenses for opening a weaving school specially for agriculturists only. This was obtained on 29th November 1921, and the weaving assistant of the Department of Industries was deputed to visit Hebsur, a village in the Hubli Taluka, and Aminbhavi, a village on the Dharwar-Savadatti Road, which were suggested by the Department of Agriculture and to report on their suitability for opening a weaving school, and Hebsur was finally selected. It is situated at about three miles from Dundur station on M. & S. M. Railway, and has a population of about 2 500. Hand-weaving is not quite unknown here as there are about 250 throw-shuttle hand-loom of the primitive type on which "gudar" or durries for threshing floors are woven by some of the local agriculturists during the non-cultivating season, but at the cultivating and harvest time the weaving work is practically stopped altogether.

4. It was thought that amongst a population of agriculturists accustomed to weaving of this kind it might be easy to introduce the weaving of plain shirting, coating, khadi dhoties, sarees and such other cloth as is ordinarily used by the villagers. A weaving school for agriculturists was therefore opened at Hebsur in March 1922, and boys as well as adult agriculturists were admitted to the school of the age ranging from 15 to 40 years. Weaving of plain cloth was taught on six flyshuttle looms and two looms were specially reserved for more intricate weaving such as twill, drill, chudders, towels, etc. The school work was supervised by a committee consisting of six leading local members of the village.

5. Before the opening of the weaving school at Hebsur "gudars" were woven there with narrow warps in short strips of 8 inches width on the throw-shuttle looms. The usual size of gudar is about 13×12 feet which is made up of 13 narrow strips 8 inches wide all sewn together to form a total width of 12 feet. With the flyshuttle loom the local weaver can now use a warp of 24 inches width. He has also been taught the manipulation of longer warps, so that he can now weave a piece of about 90 feet long and 2 feet wide. This can be cut into suitable lengths and 12 feet wide gudar can now be easily and cheaply made by sewing only 6 pieces together instead of 18. The use of longer warp saves not only time and labour but wastage of about 1 yard of warp which is necessary each time a new warp is put on the loom.

The cost of preparing warp by old and new methods is the same; but the weaving charges and sewing charges have been considerably reduced by the introduction of improved flyshuttle looms as given below :—

Throw-shuttle loom.

Gudar $13\frac{1}{2} \times 12$ feet.		Rs. a.
Charges for weaving 18 pieces $13\frac{1}{2}$ feet $\times$ 8 inches at 1 anna per piece ..	1	2
Charges for sewing 18 pieces at 1 anna per seam	1	1
Total ..	2	3

*Flyshuttle loom.*Gudar $15\frac{1}{2}' \times 12'$.Charges for weaving 6 pieces $15\frac{1}{2}' \times 24''$ at $1\frac{1}{2}$ anna per piece .. Rs. 0-9-0

Charges for sewing 6 pieces at 1 anna per seam „ 0-5-0

Rs. 0-14-0

From the above it will be seen that the cost of manufacturing a gudar has been reduced from Rs. 2-3-0 to annas 14 only by adopting new and improved methods by the agriculturists. The reduction in the cost is more than half per each gudar, while obtaining a gudar $15\frac{1}{2}' \times 12'$ instead of $13\frac{1}{2}' \times 12'$ owing to the facility obtained in using longer warps. At the end of a year's working of the school about 24 flyshuttle looms were introduced at Hebsur, 14 of which were used for manufacturing gudars and the rest for weaving plain khadi, dhoti, shirting, etc.

6. In April 1923 the weaving school for the agriculturists was transferred from Hebsur to Hulkoti, another village in the Dharwar District, with the concurrence of the Department of Agriculture. The population of Hulkoti is about 1,500 and before the school was opened the agriculturists were not familiar with the hand-weaving industry. Here 10 flyshuttle looms were fitted up and some of the agriculturists were trained in weaving plain khadi, gudar, twill, dhoties, sarees, etc. A committee of 8 prominent members of the village was formed to supervise the working of the school. During the period of one year the school was at Hulkoti, a small weaving factory with four flyshuttle hand-looms was opened by a land-owner and 20 flyshuttle looms were purchased by other agriculturists.

7. As the experiment of introducing hand-weaving amongst agriculturists was sanctioned by Government to be carried on for three years only the school from Hulkoti was transferred to Hoshalli in April 1924. This village is in the Dharwar District and was also selected by the Department of Agriculture. The population of this village is about 600 only and the art of weaving plain cloth suitable to the requirements of the agriculturists was taught to those who attended the school. The working of the school was supervised as usual by a committee of 9 members of the village and during the period of one year the school was able to train 18 agriculturists in the art of plain weaving and to introduce 12 flyshuttle looms in the village.

8. Almost all the agriculturists in the village and many others of the neighbouring villages who came to Hoshalli on bazar days visited the school and evinced much interest in the school work. This could be gauged from the fact that nine applications were received by me from various surrounding villages to open such weaving schools amidst them, some of them offering to place a house free of rent at my disposal for this purpose.

9. The period of three years sanctioned for this experiment having expired at the end of March 1925 the Government have recently extended it to a year more, and the school at Hoshalli has been transferred to Benkanhalli in Belgaum District on Mr. V. S. Phaterpekar's agricultural farm from 15th May 1925.

10. The progress of the experimental schools at Hebsur, Hulkoti and Hoshalli has been satisfactory.

Generally an agriculturist requires about six months to get himself trained on flyshuttle looms for weaving plain cloth such as khadi, panjas, dhoti, gudar, chuddar, shirting, etc. The following

figures illustrate the kind of yarn and cloth woven as also the net income earned by some agriculturists trained at our weaving schools at Hebsur and Hulkoti :—

Counts of yarn.	Name of cloth.	Hours required to weave.	Width and length of cloth.	Selling price of cloth.	Cost of yarn including warping charges.	Net income of agriculturists.
				Rs. a.	Rs. a.	Rs. a.
20's grey yarn ..	Plain Khadi or Punjas.	12 hours.	36"×12 yards.	4 4	3 4	1 0
" "	Dhoties ..	16 "	45"×12 yards.	7 0	4 12	2 4
10's grey yarn ..	Gudar or cotton durry.	8 "	27"×12 yards.	6 4	5 4	1 0
" " ..	Chuddar ..	16 "	45"×12 yards.	12 0	9 8	2 8
30's grey yarn ..	Shirting ..	24 "	36"×16 yards.	9 0	6 0	3 0
20's black yarn ..	Plain bordered saris.	12 "	45"×9 yards.	8 8	6 0	2 8

An agriculturist after six months' practice on flyshuttle looms weaves 5 to 6 yards of plain cloth and earns Re. 1 to Rs. 1-4-0 if he works for 8 hours a day. Winding and warping is done by the agriculturists' family members and the expense of each sized warp of 12 yards long comes to 12 annas which, if he or his family members prepare the warp, remains with him, and this income is over and above the net earnings of the agriculturist who only weaves the cloth.

With fine weaving, intricate designs and long practice, earnings would be double those recorded above, but agriculturists who only follow handloom weaving as a part-time occupation have not the hereditary skill and cannot obtain sufficient practice to enable them to specialise in the art of weaving finer and most costly fabrics.

11. Agriculturists being altogether novice in the art of weaving cannot be expected to be skilled weavers within a short time during which they receive their training in the school, but the number of handlooms introduced in these villages—small though it is—will serve as object lesson for others to copy and tend to promote and introduce the art of weaving gradually amongst these people to enable them to earn a living in time of the failure of crop or famine.

12. I am of opinion that three or four or even more such experimental schools should be opened in purely agricultural villages of various districts of this Presidency for teaching hand-weaving to agriculturists only. Uptil now the Department of Industries has confined the activities of its weaving section to introducing improved flyshuttle looms and preparatory appliances amongst weavers only, while the teaching of the art of weaving to men other than professional weavers has not been done or encouraged by the department, because the staff and the cost of the weaving section of this department are smaller than those of the most of the departments of industries of other provinces of this country. There is ample scope for enlarging the hand-weaving section of this department with a view to introduce hand-weaving as one of the most useful, suitable and simple cottage industries in purely rural area. Hand-loom weaving is a cottage industry in which the raw material is always handy and in which the finished product always finds a market at the door of the weaver. If it fails to do it, the weaver can use whatever he makes in his own household.

APPENDIX B.

COMMERCIAL AND INDUSTRIAL ENQUIRIES 1924-25.

Subject of enquiry.	Number of enquiries.
1. Acetone. Manufacturers of —	1
2. Acetone oil. Dealers in —	1
3. Acid Citric. Machinery for Manufacture of —	1
4. Acid Citric. Dealers in —	1
5. Acid Citric. Imports of —	1
6. Alumina. Prices of —	1
7. American cloth. Manufacturers of —	1
8. Animal breeding. Information re —	1
9. Animal Purée. Sources of —	1
10. Amonium Carbonate. Demand for and possibilities for Manufacture of —	1
11. Annatto seed. Uses of —	1
12. Apparatus, Chemical and Scientific. Dealers in —	1
13. Apprentices. Admission into Aluminium Factory.	2
14. Babul Bark. Buyers of —	1
15. Bags. Dealers in —	1
16. Balling machines. Dealers in —	1
17. Bangles and Mangalore tiles. Information re Manufacture of —	1
18. Barks. Exporters of —	1
19. Benzol. Manufacturers of —	1
20. Biscuits. Manufacture of —	1
21. Bleaching and Dyeing. Information re —	1
22. Bobbins. Manufacturers of —	2
23. Boiled oil. Manufacturers of —	1
24. Bone Mills. Names of —	1
25. Boots. Estimates for factory.	1
26. Bristles. Dealers in —	2
27. Cane. Dealers in —	1
28. Carpets. Manufacturers of —	1
29. Casein. Importers of —	1
30. Casein Industry. Prospects for —	1
31. Casings and Guts. Dealers in —	1
32. Castor-seed and Lin-seed. Sources of —	1
33. Catalogue of—Indian goods.	1
34. Catechu. Dealers in —	1
35. Cement, glass, oils, paints, etc. Manufacture of —	1
36. China clay. Imports of —	1
37. China clay. Dealers in —	1
38. China clay. Sources of —	3
39. Chemists, Industrial. Names of —	1
40. Chemical firms. Names of —	1
41. Chemists and Druggists. Names of —	1
42. Chemicals. Suppliers of —	2
43. Chemical Analysts. Names of —	1

Subject of enquiry.	Number of enquiries.
44. Cigars. Manufacturers of —	1
45. Cochineal. Information re Manufacture of —	1
46. Cocojem. Suppliers of —	1
47. Coal. Prices of —	1
48. Colour. Dealers in —	1
49. Cotton prints. Manufacturers of —	1
50. Cotton goods (grey and bleached). Dealers in —	1
51. Cotton piecegoods. Dealers in —	1
52. Cotton "AK". Buyers of —	1
53. Cardboard boxes. Suppliers of —	1
54. Curios and Arts. Dealers in —	1
54a. Cotton Waste. Exporters of —	1
55. Cutting Institutes. Names of —	1
56. Crude Sodium. Manufacturers of —	1
57. Crucibles (Japanese). Importers of —	1
58. Distemper. Manufacturers of —	1
59. Distemper, Colour and Wax. Literature on —	1
60. Divi Divi. Exporters of —	1
61. Dress makers (Ladies). Names of —	1
62. Drugs—Ayurvedic. Dealers in —	1
63. Drums (Empty). Dealers in — Manufacturers of —	1
64. Dyes. Dealers in —	3
65. Dye peoric. Manufacturers of —	1
66. Ebony wood. Consumers of —	1
67. Electric Casings. Imports of —	1
68. Electric furniture. Dealers in —	1
69. Electric power. Users of —	1
70. Engineering Colleges. Names of —	1
71. Exhibitions. Promoters of — and addresses.	1
72. Factories and Mills. Names of —	2
73. Feathers and Horns. Buyers and Exporters of —	1
74. Fertilisers. Imports and Exports of —	1
75. Fibre. Exports of —	1
76. Fibre. Machinery for extracting, bleaching, etc. —	1
77. Fibre (palmyra). Exporters of —	1
78. Fruits. Foreign dealers in —	1
79. Fruit preservation. Information re —	2
80. Fuel-Liquid. Prices of —	1
81. Gall nuts. Dealers in —	1
82. Garnets—Rough. Dealers in —	1
83. Garnets—sand fine. Dealers in —	1
84. Glass. Manufacturers of —	1
85. Glass Factories. Names of —	1
86. Glassware. Imports of —	1
87. Glue. Suppliers of —	2
88. Glue. Manufacturers of —	1

Subject of enquiry.	Number of enquiries.
89. Glue. Possibilities of Manufacture of —	1
90. Glycerine Dynamatic. Manufacturers of —	1
91. Glycerine plants. Information re Sellers of —	1
92. Glycerine refined. Manufacturers of —	1
93. Gold. Conditions re sale of —	1
94. Gold and Silver. Information re registration of—Assayers of —	1
95. Gold thread, Colour powder and Lace. Dealers in —	1
96. Goolkand. Process of Manufacture of —	1
97. Gims. Dealers in —	2
98. Gramophone, Cutlery (German make). Dealers in —	1
99. Gypsum. Manufacturers of —	1
100. Handloom factories. Names of —	1
101. Horn articles. Dealers in or Manufacturers of —	1
102. Hosiery. Enquiry re import duty on —	1
103. Hubbucke's. Address of the factory of —	1
104. Ice Machinery. Dealers in —	1
105. Iron and steel. Imports of —	1
106. Lac. Cultivation of — Information re —	2
107. Lametta. Dealers in —	2
108. Leather—Buffalo. Dealers in —	2
109. Lime juice. Enquiry re Machinery for —	1
110. Locks. Buyers of —	3
111. Machinery. Confectionery—Manufacturers of —	1
112. Machinery. Envelope making—Manufacturers of —	1
113. Machines. Grinding—Dealers in —	2
114. Machinery. General—Dealers in —	1
115. Machinery. Jewellers—Manufacturers of—	3
116. Machinery. Jute Mill—Manufacturers of—	1
117. Machinery. Oil Mill—Manufactures of—	1
118. Machinery. Rope and Mattress—Manufacturers of—	1
119. Machinery. Soap Manufacture—Dealers in —	1
120. Machinery. Trimmings—Manufacturers of —	1
121. Machinery. Umbrellas—Manufacturers of —	1
122. Magnesium Sulphate. Dealers in —	1
123. Match boxes. Imports of —	1
124. Match Manufacture. Institutes giving training in —	2
125. Mechanical Engineering. Institutes giving training in —	1
126. Mica. Source of — Dealers in —	1
127. Mines—Copper. Names of —	1
128. Minerals. Literature on —	1
129. Minerals. Foreign buyers of —	1
130. Molasses. Imports of — Uses of —	1
131. Mouldings—Picture frame. Imports of —	1
132. Motors and Dynamos. Manufacturers of—	1
133. Nickle sheets. Dealers in —	1
134. Nuts—Ivory. Buyers of —	1

Subject of enquiry.	Number of enquiries.
135. Nux Vomica. Exporters of —	1
136. Oil. Exporters of —	1
137. Oil. Information re Analysis of —	2
138. One bath chrome. Demand for —	1
139. Oil. Information re percentage of — in certain seeds.	1
140. Oil. Castor—Suppliers and Manufacturers of —	1
141. Oil cake. Exporters of —	1
142. Oil. Cotton seed—Dealers in — Manufacturers of —	2
143. Oil. Fish—Dealers in —	1
144. Oil. Linseed—Manufacturers of —	1
145. Oil Mills and Soap factories. Names of —	2
146. Oil seeds and other products. Literature on —	1
147. Packing materials. Dealers in —	1
148. Paper corrugated. Manufacturers of —	1
149. Paper crackers. Enquiry re license for —	1
150. Paper Mills. Names of —	3
151. Paper Industry. Information re —	1
152. Paraffin Wax. Sources of —	1
153. Patents. Information re —	1
154. Pearls—Ceylon. Particulars re —	1
155. Piecegoods. Indian Demand for — in Bagdad. —	1
156. Picture post cards. Dealers in —	1
157. Potteries. Names of —	1
158. Prints. Indian—Manufacturers of —	1
159. Rags and Waste. Exporters of —	1
160. Registration of firms. Enquiry re —	1
161. Rings clay. Manufacturers of —	1
162. Rosh grass. Buyers of —	1
163. Sheep guts. Buyers of —	1
164. Silk. Artificial—Manufacturers of —	1
165. Silk. Piecegoods—Dealers in —	1
166. Silk (Raw). Buyers of —	1
167. Silk yarn. Dealers in —	1
168. Soap. Toilet and Washing—Literature on —	1
169. Soap Manufacture. Institutes giving training in —	1
170. Sodium Carbonate. Prospects of Manufacture of —	1
171. Sugarcane Presses. Manufacturers of —	1
172. Sugar Manufacture. Institutes giving training in and cost of —	1
173. Sulphur. Dealers in —	1
174. Sulphuric Acid, Sulphate Ammonia. Manufacturers of —	1
175. Starch—Manufacturers of — Prospects of — Industry.	1
176. Steam Engines. Builders of —	1
177. Steel castings. Imports of —	1
178. Steel pipes. Suppliers of —	1
179. Steel wire ropes. Dealers in —	1
180. Stationery. Dealers in —	1

Subject of enquiry.	Number of enquiries.
181. Stone chips. Dealers in —	1
182. Styra. Vernacular names of and dealers in —	1
183. Synthetic stones. Possibilities of manufacture of —	1
184. Tailoring firms. Names of —	1
185. Tallow. Dealers in —	1
186. Tanneries. Names of —	1
187. Technical schools. Names of —	3
188. Tendoo leaves. Particulars of —	1
189. Thymol crystals. Manufacturers of —	1
190. Tiles. Manufacturers of —	1
191. Timber. Dealers in —	1
192. Tin boxes. Manufacturers of —	1
193. Toluoc. Conditions to import —	1
194. Tools. Manufacturers of —	1
195. Tractors. Dealers in —	1
196. Trade and Industry. Literature on —	1
197. Tubes and Bucket—Possibilities of — Industry.	1
198. Twisted yarn. Manufacturers of —	1
199. Varnishes. Manufacturers of —	1
200. Vinegar. Manufacturers of —	1
201. Water proof cloth. Process re Manufacture of —	1
202. Waxes. Dealers in —	1
203. Weaving schools. Names of —	1
204. Whale oil. Imports of —	1
205. Wick. Manufacturers of —	1
206. Wood for Matches. Information re concessions —	1
207. Wood for matches. Sources of —	1
208. Woollen Mills. Names of —	1
209. Yarn (bleached). Dealers in —	1
210. Yarn. Dyeing of —	1
211. Yarn and Piecegoods. Dealers in —	1
212. Yarn (ramic). Dealers in or Manufacturers of —	1
213. Zinc dust. Buyers of and imports of —	1
214. Zinc paints. Dealers in —	1